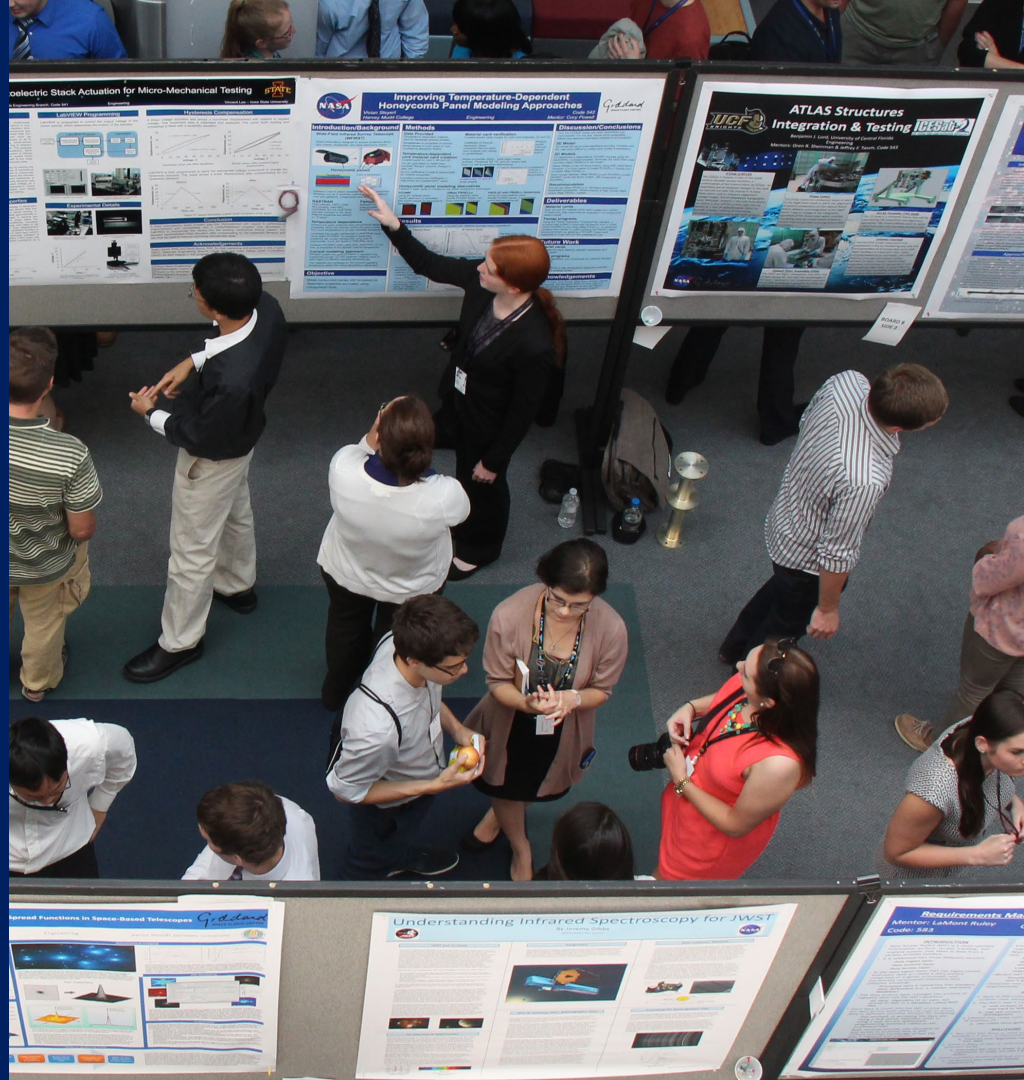


Designing Research Posters

Ana Avilés & Li Wang
Research Services
Student & Scholarly Services

[woodleywonderworks](#) via flickr



Learning objectives for this session:

- Planning your content
- Designing your poster
- Examine examples
- Software & resources



Planning your content



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Why do you want to make a poster?

- Assignment
- Conference
- Research Showcase

Research Services Student and Scholarly Services



Find us on the
ResearchHub

We are a **team of 13** who support researchers from all disciplines and levels across the University. Our focus is on helping researchers increase their opportunities and develop their skills and knowledge.



What do we do?

Help increase opportunities for researchers



Boosting visibility

- Dissemination and publishing
- Research Communication
- Funding and Collaboration support
- Profile Building



Recognition and career development

- Reporting
- Promotion
- Early Career Researcher support

Develop researchers skills and knowledge



Searches, finding knowledge



Skills development and providing expertise

When do people seek our support?



SKILLS DEVELOPMENT



RESEARCH COMMUNICATION



PROFILE BUILDING



PROMOTION & FUNDING

Who else do we work with & what else do we do?

Within Student and Scholarly Services

- Learning and Teaching Development and Career Development and Employability Services; *joint projects, workshops*
- Content Discovery and Innovation; *institutional repository support, joint projects*
- Collection Development and Access; *Open Access Publishing Agreements, Te Waka Huia Rangahau | Research Outputs*
- Academic Engagement; *communication with stakeholders, joint projects*

Across the University

- Research and Innovation Office, Researcher Development, Research Funding and Research Impact Teams; *support for capturing and evidencing research impact, bespoke workshops on publishing & profiles, bespoke reporting*
- School of Graduate Studies; *support for PhD Candidates, workshops*
- Center for eResearch; *joint projects, workshops*
- Planning and Information Office; *support for university rankings*
- Academic Heads and Senior Leaders; *bespoke reporting, bespoke workshops and support*
- Digital Services, Connect, System Admins for Te Waka Huia Rangahau | *Research Outputs*

What is the purpose of your poster?

- Share your research findings
- Promote your research
- Look for funding
- Discuss your research methods

Mussel decline and recovery potential in Kenepuru Sound

Trevyn Toone^{1,2}, Emilee Benjamin^{1,2}, Sean Handley², Jenny Hillman¹, Andrew Jeffs¹

¹Institute of Marine Science, University of Auckland, Auckland, New Zealand

²National Institute of Water and Atmospheric Research, Nelson, New Zealand

Introduction

- Mussels perform vital ecosystem services including **water filtration, habitat creation, and denitrification** and generate over **\$300 million** through New Zealand aquaculture
- Mussels globally have seen **substantial declines** from overharvesting, habitat loss, and other factors
- In NZ, Kenepuru Sound was historically an area of **dense intertidal mussel beds**
- These beds are locally reported to be depleted, leading to calls for restoration
- However, **no surveys** of these beds have been conducted since the late 1960s, so current green-lipped mussel populations are unknown
- To inform **future restoration efforts**, we first need clear data on **current and historic populations and factors behind population changes** over time



Each dot represents an area with over 30 mussels/m² in 1969, compare this with current levels in poster centre!

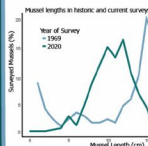
Methods

- Surveyed 55 km of shoreline or almost the entire Kenepuru
- Recorded green-lipped mussel **abundances, densities, and lengths**
- Mapped mussel distributions for comparison to historic surveys
- Interviewed **9 long-term local residents** (50+ years in the area)
- Asked questions about **historical mussels, population declines, and factors behind declines or recoveries**.



Resurvey Results

- Resurveys recorded **88,000** mussels
- Mussels were throughout Kenepuru, but in **very low densities**, with an average of between one and two mussels/m²
- **Only two sections reached 30 mussels/m²**, common in the 1960s, and nowhere currently approaches the historical highs of 70/m²
- Mussels also **no longer reach maximum historical sizes**
- Very few mussels under 30 mm were found, unlike in historical surveys, indicating **problems with natural recruitment**



Conclusions

- Intertidal green-lipped mussels were **once widespread**
- **Commercial handpicking** in the 1970s and 1980s **decimated their populations**
- Populations have **not rebounded** and current populations are low, scattered, small, and showing no signs of recovery
- Multiple factors are behind lack of recovery
- **Future research** will focus on narrowing down which factors are preventing natural recovery and how restoration efforts can best **overcome barriers** to success



Interview Results

- Residents confirmed **widespread and dense historical mussel populations**
- "Used to be a line of mussels along the shoreline... 2-3 metres wide"
- Participants also unanimously indicated **handpicking in the 1970s as the cause of steep population declines**
- "The concentration of the pickers... they'd take every mussel"
- Residents were more split on **why mussels have not recovered** since handpicking stopped in the mid 1980s.



Six commonly suggested recovery barriers

Acknowledgments

- I'd like to thank Andrew Jeffs, Jenny Hillman, Sean Handley, Emilee Benjamin, and Cornelius Prinsloo for their support
- I also thank the wonderful Kenepuru community members who shared their homes and insights with me.
- Funding for the project was provided by the University of Auckland and ethics approval was received under reference number UAHPEC2564

Visit our lab site for more info!



I'd love to hear from you!

✉ ttoo112@aucklanduni.ac.nz

📱 @trevtoone



Or contact me and follow the project here!

Who is your audience?

- Colleagues in your department
- Attendees of an academic conference
- General public

The Lifetime Revision Risk of Unicompartmental Knee Arthroplasty

Mei Lin Tay^{1,2}, Gary J Hooper³, Chris M Frampton³, Simon W Young^{1,2}

¹Dept. of Surgery, University of Auckland, Auckland, New Zealand, ²Dept. of Orthopaedic Surgery, Waitematā DHB, Auckland, New Zealand, ³Department of Orthopaedic Surgery and Musculoskeletal Medicine, University of Otago, Christchurch, New Zealand

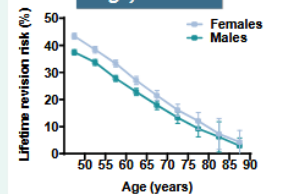


MEDICAL AND HEALTH SCIENCES

Aim: To calculate the revision risk of unicompartmental knee arthroplasty (UKA) over a patient's lifetime as a more reliable and easier to understand metric

Patients: All primary UKAs performed between 1999 and 2019 captured by the New Zealand Joint Registry (n=13,481)

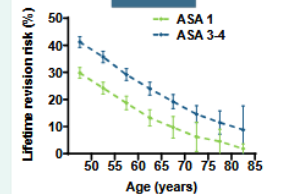
Age, Gender



Younger patients and females have higher risk of revision

- Under 50: 40.4% vs. over 85: 3.7%
- Females 4-43% vs. males 3-37%

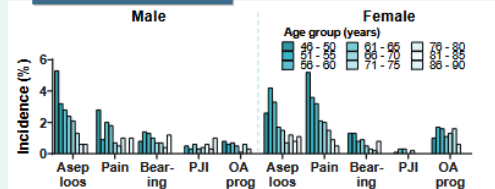
ASA



Patients with higher ASA status had higher risk of revision

- ASA 3&4: 41% vs. ASA 1: 2-28%

Reasons for revision

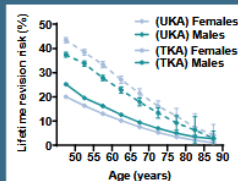


Higher risk of revision for females may be associated with higher incidence of pain

- Females: 2.3% vs. males 1.2%

ASA, American Society of Anesthesiologist status; aseptic loosening; bearing; bearing dislocation; OA prog, osteoarthritis progression; PJI, periprosthetic joint infection

Comparisons to total knee arthroplasty (TKA)



Lifetime risk of UKA revision is two-fold higher than TKA
UKA 40% vs. TKA 22%

Males have higher risk for TKA
3-25% vs. females 1-20%
whereas females have higher risk for UKA 4-43% vs. males 3-37%

Conclusions

- The lifetime risk of UKA revision is higher for younger patients, females, and those with higher ASA status
- Lifetime risk of UKA revision was two-fold higher than TKA; the biggest difference was for young females

ACTIVITY: Write a one sentence summary explaining your research topic.

How will you communicate your message?

- How much context to include
- Methodology or findings
- Use of graphics or graphs
- Link to next steps
- Include references

VALUING THE GULF

BEYOND ECONOMICS: THE SOCIAL AND CULTURAL VALUE OF LARGE MARINE PREDATORS

BACKGROUND

Globally, marine ecosystems provide 65% of all ecosystem goods and services, of which humans are dependent on. Tikapa Moana Te Moananui-a-Toi the Hauraki Gulf (the Gulf) is home to an array of large marine predators (cetaceans, rays, seabirds) which provision numerous ecosystem services of economic, ecological, cultural, and social importance.¹

Yet, the Gulf is highly vulnerable and rapidly degrading due to climate and anthropogenic pressures.²

Large marine predators are often indicators of ecosystem health,³ so understanding shifts in their distribution is important for ecological monitoring and valuing the Gulf.⁴ Though, the social and cultural value of these species are often underrecognised during valuations, which are typically economic focused.⁵

AIM

Using a holistic, ecosystem-based approach, I will integrate ecology with cultural and societal values to identify vulnerable species and habitats of large marine predators, and the ecosystem services they support in the Gulf.

METHODS



Assign social & cultural values to species



Species distribution modelling (SDM)



Overlay social & cultural indices to SDM

EXPECTED RESULTS

Large marine predators will have species-variable spatial distributions throughout the Gulf, often largely dependent on prey availability.⁶

Example SDM:



Example SDM with social & cultural indices:



Overlaying social (yellow) and cultural (pink) indices onto the SDM identifies areas of importance where vulnerable species and habitats in the Gulf intersect with human values. These areas may diverge from modelled species distributions and indicate priorities for future monitoring.

RESEARCH SIGNIFICANCE

The Gulf is an economic giant—contributing \$5.14B to our GDP annually,⁷ yet this valuation overlooks cultural and societal values which hold significant natural capital potential.⁸ This research will build on existing government frameworks to revitalise the Gulf,⁹ while placing large marine predators at the forefront—an approach yet to be implemented.

NEXT STEPS

1. Use ecosystem-based matrices to capture cultural and social values of large marine predators linked to tourism, recreation, and education.
2. Collate sightings data of large marine predator to generate SDMs and overlay social and cultural indices to value the Gulf beyond economics.

1. Costanza et al., 2014, *Global Environmental Change*

2. Hauraki Gulf Forum, 2022, *State of the Environment Report*

3. Stephenson et al., 2023, *Diversity & Distributions*

4. Hooper & Gerber, 2004, *BiScience*

5. Cook et al., 2020, *Ocean & Coastal Management*

6. Geange et al., 2019, *Ecosystem Services*

7. NZIER, 2023, *Report for the Hauraki Gulf Forum*

8. Oued-Elouadi et al., 2023, *Scientia Marina*

9. NZ Govt., 2021, *Revitalising the Gulf: Govt. Action*

Are there other things to include?

- Acknowledge collaborators
- Include your institution
- Showcase the researcher
- Promote publications, websites, or future research

The influence of the Drygalski Ice Tongue on water mass transformation in Terra Nova Bay.

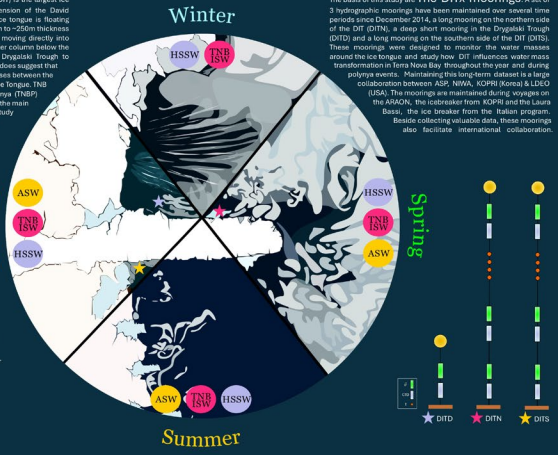


Liv Cornelissen^{1,2}, Craig Stevens^{1,2}, Melissa Bowen¹, Sukyong Yun³, Jasmin McInerney², Brett Grant², Seung-Tae Yoon^{3,4}, Fiona Elliott^{2,5}, Christopher J Zappa⁶ & Won Sang Lee⁷.

¹University of Exeter (UK), ²National Institute of Water and Atmospheric Research (NZ), ³Korea Polar Research Institute (KPRI), ⁴Korea Polar Research Institute (KPRI), ⁵University of Bergen (NO), ⁶South Florida Earth-Observatory, Columbia University, NYC USA

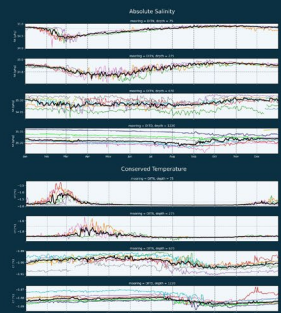
The Drygalski Ice Tongue (DIT) is the largest ice tongue in Antarctica, it is the floating extension of the David Glacier. Around 90km of the 140km long ice tongue is floating unconfined and ranges from more than 1500m to 250m thickness near the tip. The DIT prevents sea ice from moving directly into Terra Nova Bay (TNB) from the south. The water column below the ice tongue masses from ~500m above the Drygalski Trough to ~400m near the tip and Stevens, et al., (2024) does suggest that there is exchange and advection of water masses between the northern and southern side of the Drygalski Ice Tongue. TNB is a highly active area as it opens up areas to polynyas (INBP) from Autumn well into spring, forming HSSW, the major ingredient of Antarctic Bottom Water. In this study we focus on the importance of the DIT on the polynya processes like water mass formation, mixing and circulation.

- HSSW High Salinity Shelf Water
 $\rho > 1028 \text{ kg m}^{-3}$, $S_{\text{max}} > 34.8 \text{ ‰}$
- TNBW Terra Nova Bay Ice Shelf Water
 $T_{\text{min}} < -1.94 \text{ °C}$
- ASW Antarctic Surface Water
 $T_{\text{max}} > -1.7 \text{ °C}$



The basis of this study are The DITx moorings. A set of 3 hydrographic moorings have been maintained over several time periods since December 2014, a long mooring on the northern side of the DIT (DITN), a deep short mooring in the Drygalski Trough (DITD) and a long mooring on the southern side of the DIT (DITS). These moorings were designed to monitor the water masses around the ice tongue and study how DIT influences water mass transformation in Terra Nova Bay throughout the year and during polynya events. Maintaining this long-term dataset is a large collaboration between ASP, NAWA, KPRI (Korea) & LDEO (USA). The moorings are maintained during voyages on the ARON, the icebreaker from KPRI and the Laura Basu, the ice breaker from the Italian program. Beside collecting valuable data, these moorings also facilitate international collaboration.

The seasonal cycle of the water mass transformation around the DIT.



The Drygalski Ice Tongue

In Winter, the DIT is surrounded by sea ice and TNB polynya opens and closes, forming HSSW in the process. During polynya events, we believe water from outside of TNB is drawn into the bay past the DIT to replenish the flushed out water mass. HSSW also reaches the DIT, melting the ice tongue and forms ISW. The water masses in winter have the smallest thermohaline variability.

In Spring, the sun starts to melt the sea ice, however the DIT is most years surrounded by sea ice throughout the season. ASW is formed and observed near the ocean surface. Polynya events during spring do not increase the salinity as the melt water entrains the top layer near the ocean and HSSW is disappearing in the top half of the water column. TNB ISW is formed by HSSW mixing with melt water and is likely the cause of the temperature drop observed in most years in December.

In Summer, Terra Nova Bay is mostly ice free, and the DIT is exposed to open water. In some years, southern side of the DIT is surrounded by pack ice, while in other years it is ice free. Around the tip of the DIT, sea ice is transported by the Victoria Land coast current along the ice tongue into Terra Nova Bay. Strong wind events do not form substantial amounts of sea ice and no HSSW is formed during this season. ASW dominates the water masses observed in the top half of the water column, while the bottom instruments only measure HSSW.

In Autumn, sea ice starts to form again in the TNB polynya and the southern side of the DIT gets surrounded by sea ice earlier than the northern side, polynya events mostly push the sea ice formed in TNB eastward out of the bay. ASW quickly disappears by the heat fluxes to the atmosphere. The salinity responds slower than the temperature changes and it increases by the formation of sea ice, breaking down the stratification before the HSSW production begins. TNB ISW is observed in some years during this season.

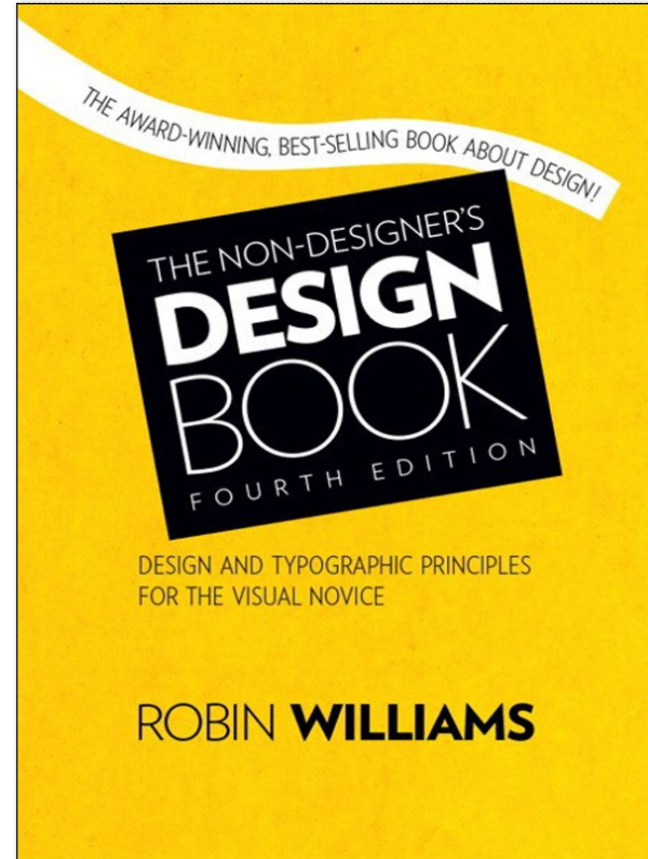
Designing your poster



Photo by [Steve Johnson](#) on [Unsplash](#)

Basic principles of good design

- **P**roximity
- **A**lignment
- **R**epetition
- **C**ontrast



Proximity

- Items relating to each other should be grouped close together.
- Space is used to create separation.

VULNERABILITY ANALYSIS OF WOODEN-FRAMED HOUSES IN WELLINGTON

Catalina Miranda - Charlotte Toma
Ken Elwood - Julia Becker - David Johnston



Background



Observations of damage after major earthquakes align with the design philosophy of international standards. However, poor performance has been reported with respect to how society expects the built environment to perform in an earthquake.

Data Collection



Three thousand questionnaires were distributed in 21 different suburbs in the Wellington region targeting owner occupied wooden framed housing.
From the 3000 questionnaires, 80 participated in the structural survey, where data on structural elements, plan and vertical shape, materials and strengthening techniques was collected.

Typology

Vertical Shape

Five simple geometries were used to classify houses vertically.



Plan Shape

Four simple geometries commonly used were selected, including rectangle, L, T, and Z shapes.



Retrofitting

The results will be presented by using fragility curves of the developed typology considering the application of different retrofit solutions, which varying from engineered solutions to builder and owners instigated ideas.



Objectives



Align performance levels in major seismic events with expected damage from the perception of homeowners.

Carry out a systematic analysis examining social demands of damage.



Assess retrofit solutions against structural performance considering the seismic vulnerability of existing houses located on slopes in the Wellington region.

Findings



Although more than 50% have a rectangular plan shape, they often have a concentration of openings mainly on the downslope side, which results in an irregular stiffness distribution.



More than 90% were built before the introduction of NZ timber standards.

85% have vertical irregularities.

Foundations
25% only timber piles,
25% only concrete piles,
50% mix of concrete and timber piles.

41% self identified as having some level of seismic strengthening.

70% are two-story houses, which include them of the scope of the EQRS provisions.

Vulnerability Analysis

Using the typologies, numerical models will be used to investigate the effects of these variables on the performance measures.

An Incremental Dynamic Analysis (IDA) will facilitate the evaluation of the probability distribution of a structural demand parameter, the maximum inter-story drift, for a given seismic intensity level, pseudo acceleration ($S_a(T=0.3s)$).



Conclusions

The future seismic performance of existing wooden framed houses obtained will be compared with homeowners' expectations of damage to houses, revealing the extent of the gap between engineering current design and community expectations.

This multidisciplinary and innovative research will contribute to the suite of research being conducted around the Wellington Scenario and to the ongoing work on building a resilient community.



cmir794@aucklanduni.ac.nz



Te Hirainga Pū: QuakeCoRE
Auckland-based centre for earthquake research



UNIVERSITY OF AUCKLAND

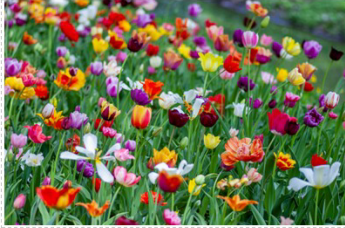


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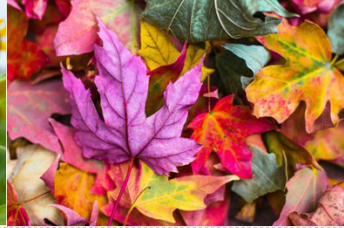


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SPRING

Spring, also known as springtime, is one of the four temperate seasons, succeeding winter and preceding summer.

Spring and "springtime" refer to the season, and also to ideas of rebirth, rejuvenation, renewal, resurrection and regrowth.

SUMMER

Summer or summertime is the hottest and brightest of the four temperate seasons, occurring after spring and before autumn. At or centred on the summer solstice, daylight hours are the longest and darkness hours are the shortest, with day length decreasing as the season progresses after the solstice.

AUTUMN

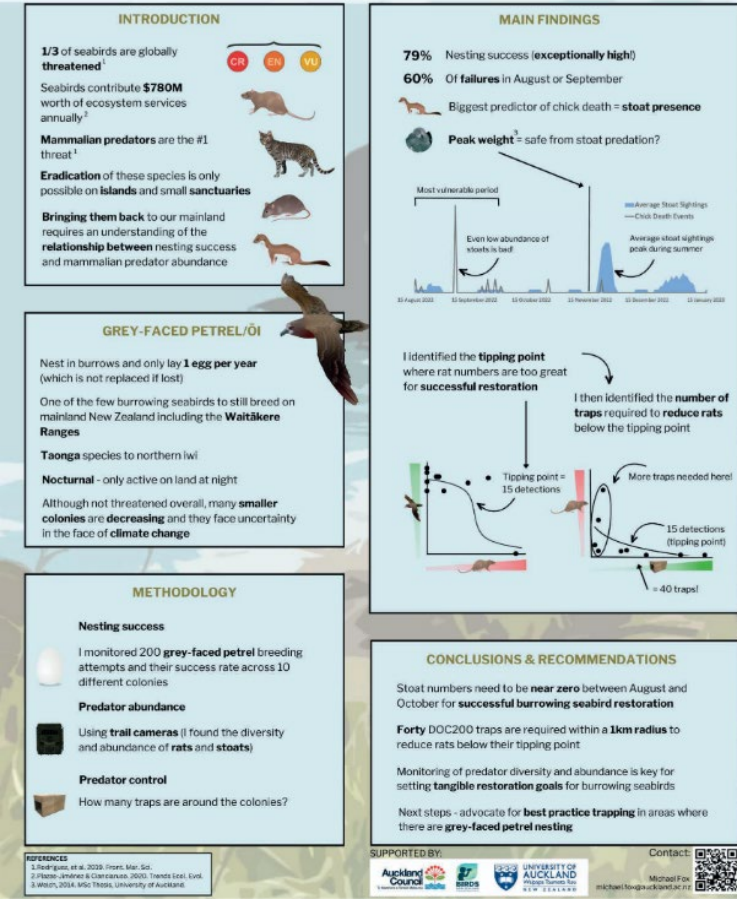
Autumn, also known as fall in North American English, is one of the four temperate seasons on Earth. Outside the tropics, autumn marks the transition from summer to winter, beginning in September (Northern Hemisphere) or March (Southern Hemisphere). Autumn is the season when the duration of daytime becomes noticeably shorter and the temperature cools considerably.

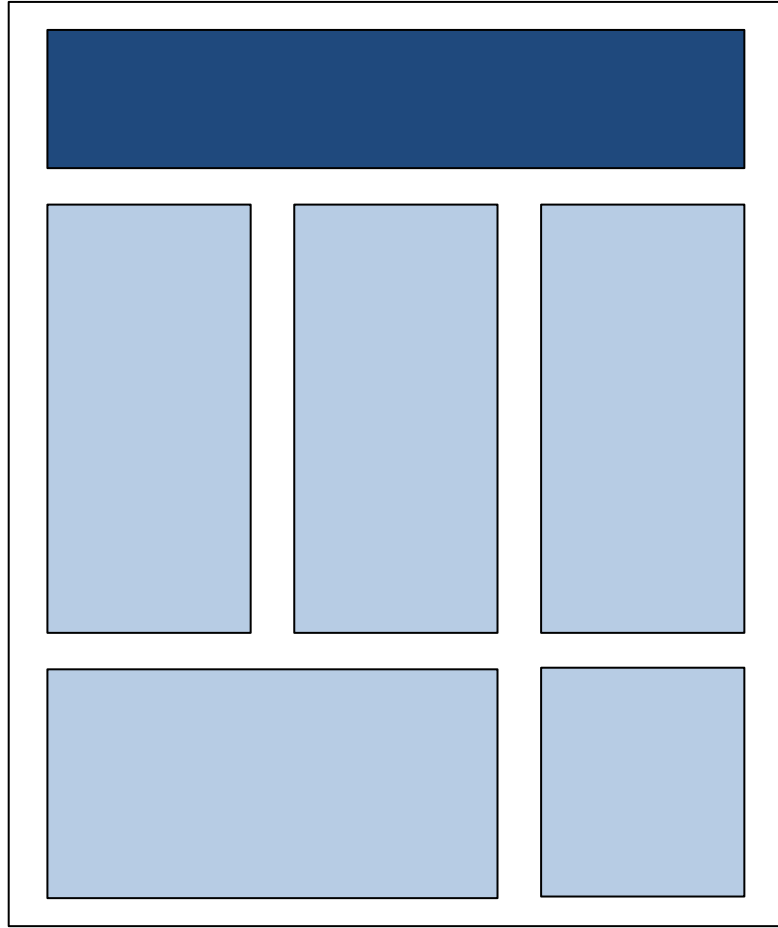
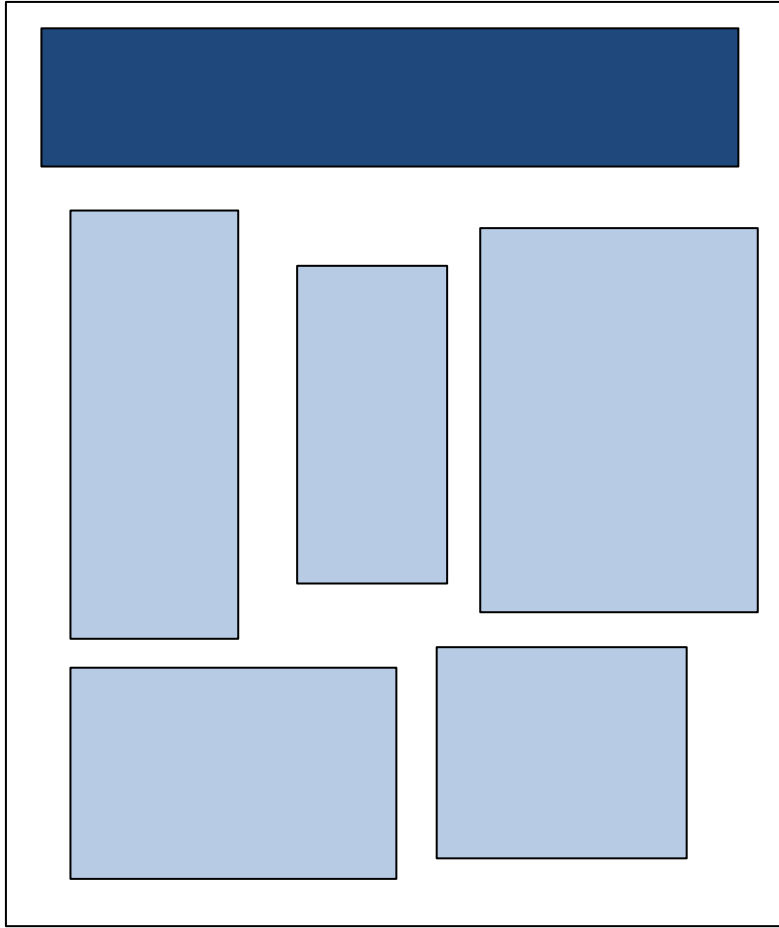
WINTER

Winter is the coldest and darkest season of the year in temperate and polar climates. It occurs after autumn and before spring, when the hemisphere is oriented away from the Sun as a result of the tilt of Earth's axis. Different cultures define different dates as the start of winter, and some use a definition based on weather.

Alignment

- Every element should have a visual connection with another element.
- This improves readability and guides the eye from one section to the next.





In typesetting, justification (sometimes referred to as 'full justification') is the typographic alignment setting of text or images within a column or "measure" to align along both the left and right margin. Text set this way is said to be "justified."

In justified text, the spaces between words, and, to a far lesser extent, between glyphs or letters (known as "tracking"), are stretched or sometimes compressed in order to make the text align with both the left and right margins.

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Repetition

- Repeat visual elements including colours, shapes, textures, fonts, spatial relationships, etc.
- Develops organisation
- Strengthens unity



Contrast

- This involves arranging opposing elements to create visual interest and highlight key information.
- Contrast helps users understand what is most important.

PREDICTING THE MILKYWEY

Josefina Barrera Morelli
Cushla McGoverin
Michel Nieuwoudt
Stephen E. Holroyd
Lisa I. Pilkington

WHY Milk ?

- Milk is a **complex matrix** containing proteins, fat, carbohydrates, minerals, and other biologically active compounds
- Over 897 million metric tons of animal milk are **produced for human consumption** (worldwide) per year, and about **80% is from cows!**

AIM

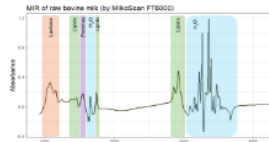
- Develop improved models for **predicting the concentration of milk components**, prioritizing components such as individual fatty acids and minerals, from MIR spectra

HOW? (METHODOLOGY)

- Compare models generated with the current gold standard algorithm, PLSR, to models made using **machine learning algorithms**
- Tested algorithms: Partial Least Square Regression (PLSR), Artificial Neural Networks (ANN), Support Vector Regression (SVR), Random Forest Regression (RFR), Gradient Boosting Machines (GBM)
- Models were built using 932 samples and tested on 310 samples, and MIR regions: 925-1592, 1,727-1,793, 2,625-2,999 cm^{-1}

WHAT TO PREDICT?

- Milk **COMPOSITION** is often used to determine **quality and payment parameters** in the dairy industry, requiring **efficient measurements and accurate values**
- Mid-infrared (**MIR**) **spectroscopy** is the preferred method for routine quantification around the world, using electromagnetic waves and the vibrational frequencies of molecules to **identify compounds and their concentration in milk**
- **MIR is rapid, cost-efficient and ecofriendly** compared to traditional analysis, and relies on **mathematical models** to relate the MIR spectra to concentrations of compounds measured by traditional analysis?
- The **mathematical models** can then be used to **PREDICT** the composition from new samples using the **MIR spectra**, skipping the traditional analysis

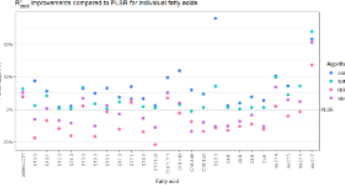


MIR of raw bovine milk (by MidScan FT8000)

10 selected MIR regions with the highest associated to some common components¹⁴

RESULTS: ANN and SVR had significantly better performance

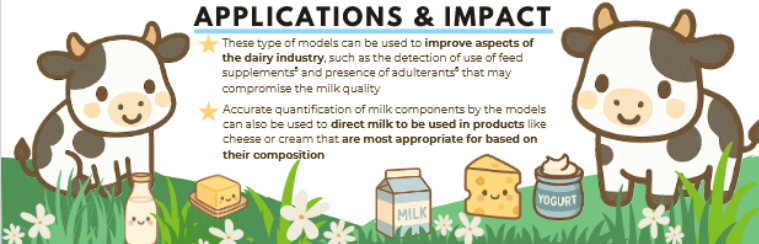
in predicting the composition of fatty acids, compared to PLSR, while RFR and GBM were not as good



PLSR improvements compared to PLSR for individual fatty acids

APPLICATIONS & IMPACT

- These type of models can be used to **improve aspects of the dairy industry**, such as the detection of use of feed supplements² and presence of adulterants² that may compromise the milk quality
- Accurate quantification of milk components by the models can also be used to **direct milk to be used in products** like cheese or cream that are **most appropriate for based on their composition**



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Te Haka Kōwhiri
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TEXTBOOKS



BIOGRAPHIES



FICTON BOOKS



ATLASES



Waipapa
Taumate Rau
University
of Auckland

P.A.R.C in action

Title: Attention grabbing

Names of the people that did the research

Introduction

The introduction gives your audience some background to your work. You need to explain why your research is important and why they should care. What were the objectives of your study? What research question were you trying answer?

Methods

Outlines how you conducted your research. Summarise your methods and avoid lengthy detail. Consider using a flowchart or diagram, in addition to text, when describing your methods.

```
graph TD; Control[Control: Placebo sugar pill single dose]; Intervention[Intervention: Drug X 30 mg single dose]; Control --> Measure[Measure y parameters every 5 mins for 30 min]; Intervention --> Measure;
```

Females	n=11	n=10
Males	n=10	n=12
Total	n=21	n=22

Results

Summarise your data in easy to understand graphs or tables. What does your data show? Avoid reading your graphs to your audience. Instead, point out the highlights and trends shown by your data.

Gender	Control	Drug X
Males	~20	~48
Females	~30	~65

Time (min)	Drug X	Control
0	0	0
5	~1	~1
10	~2	~4
15	~3	~8
20	~4	~12
25	~5	~16
30	~6	~18

Discussion

Interpret your results. What do your results mean? Why did you get these results? Answer your research question. What further work would you suggest doing?

Conclusions

What is your take home message?

References

1. If you have to include references, keep them small. 2. Your reader will be interested in your results, so don't devote too much space to references.

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Acknowledgements


P.A.R.C in action



Exploring the Properties of Oligo(3-hexylthiophene) on Polycaprolactone

Yuhua Ude¹, Eddie Wei Chi Chan^{1*}, Nigel Kirby¹, David Barber², Jadranka Travas-Sejdic^{1*}

¹Macchermi Institute for Advanced Material and Technology, Wellington, ²Bioorganic Materials Centre, School of Chemical Sciences, University of Auckland, Auckland, ³Australian Nuclear Science and Technology Organisation, Melbourne.



Background

Translating electronics is an emerging field of electronic devices that are capable to disintegrate into environmentally benign products. Conducting polymers have opportunities in this field, as they can be combined with natural or bio-inspired materials to make multifunctional semiconductors that can be used to build transistors. These novel materials have opportunities in biomedical applications (e.g. implantable devices), as they can be designed to breakdown in certain conditions, and they are more biocompatible and flexible compared to traditionally used rigid, inorganic devices.¹

Research Aims

- Prepare a series of PCL-graft-O3HT with different lengths of O3HT and grafting densities on PCL.
- Characterise the properties of PCL-graft-O3HT polymers.
- Explore the potential applications as a transient semiconductor.

Research questions

- How does the O3HT length and grafting density affect how the chains organise in the crystalline domain?
- How does this affect the properties of the material?

Results and Conclusions

Molecular Organisation of O3HT Chains

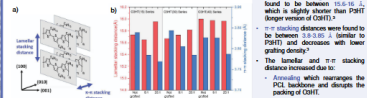


Figure 1. (a) The repeating unit of O3HT chains in the crystalline domain. In the lamellar and π-π stacking distance of crystalline O3HT chains in the crystalline domain. (b) The lamellar and π-π stacking distance of crystalline O3HT chains in the crystalline domain. (c) The lamellar and π-π stacking distance of crystalline O3HT chains in the crystalline domain. (d) The lamellar and π-π stacking distance of crystalline O3HT chains in the crystalline domain.

Electrochemistry

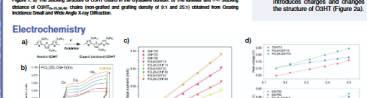


Figure 2. Electrochemical oxidation of O3HT. (a) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate. (b) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate. (c) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate. (d) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate.

Film Formation

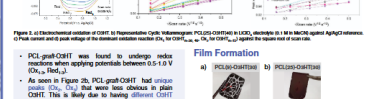
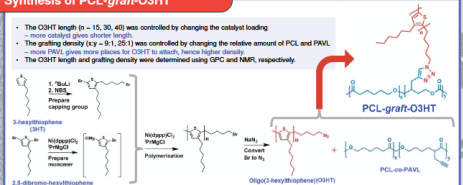


Figure 3. Electrochemical oxidation of O3HT. (a) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate. (b) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate. (c) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate. (d) Cyclic voltammogram of O3HT in LiClO₄ electrolyte at 100 mV/s scan rate.

Synthesis of PCL-graft-O3HT

- The O3HT length (*n* = 15, 30, 45) was controlled by changing the catalyst loading.
- Monomer catalyst gives shorter length.
- The grafting density (*x* = 1, 2, 3) was controlled by changing the relative amount of PCL and PAWL.
- Monomer PAWL gives more places for O3HT to attach, hence higher density.
- The O3HT length and grafting density were determined using GPC and NMR, respectively.



Next Steps

- Explore processing conditions to optimize the film formation.
- Demonstrate a potential biomedical application with a device that use PCL-graft-O3HT.
- Study the degradation products and their effects on biological cells.

Acknowledgements

I would like acknowledge Marsdon Fund for sponsoring the project and New Zealand Synchrotron Group for funding the research collaboration with the Australian Synchrotron.

Contact details: yuhua1@macchermi.ac.nz

Towards Personalised Orthopaedic Care: Validation of the Digital Knee

Annah McPherson
Department of Exercise Sciences, The University of Auckland
Supervisors: Sarah Ward, Andrew McDaid

The Digital Knee®

Recent advancements in wearable technology has enabled the digitisation of parts of the rehabilitation care pathway.^{1,2} OPUM Technologies have developed the Digital Knee® wearable sensor (an integrated accelerometer and goniometer) embedded into a commercially available knee brace which is paired with the OPUM Lab mobile application.

Validation of gait metrics from the Digital Knee® against a gold standard system GAITRite® is required.^{3,4}


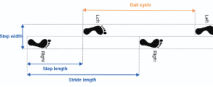
Aim

- To determine the level of agreement of the OPUM Digital Knee® wearable with the gold standard measurement system GAITRite®, for assessing lower limb gait metrics.


Methods

34 healthy participants were fitted with the OPUM Digital Knee® on their dominant limb.

- Walk over the GAITRite®, twice at normal walking speed, twice at fast walking speed.
- Outcomes: Stride length, stride time, gait speed.
- Parameters from Digital Knee® compared to that of GAITRite® using Bland Altman plots (mean bias, LOA, PE) and ICC_{2,1} to determine agreement and concurrent validity of the two measurement systems.

The Digital Knee® is a valid tool for assessing lower limb gait metrics.



OPUM clip-on Digital Knee® which connects via Bluetooth to a mobile device and stores data in the Digital Knee Lab

Adjustable brace length

Corflex Contender Post-op Knee Brace®

Hinge with adjustable ROM to support the knee post-operatively ROM -10° to 100°

Quick-release buckles and adjustable straps to optimise fit and comfort

OPUM



img0132@macchermi.ac.nz

Results

Table 1. Test-retest agreement and concurrent validity between the OPUM Digital Knee® and GAITRite® for assessing gait metrics.

Measurement Unit	Unit	Mean	SD	ICC _{2,1}	ICC _{2,1} 95% CI	ICC _{2,1} 95% CI
Stride Length	m	1.41 (0.15)	0.15 (0.05)	0.98	0.97-0.99	0.97-0.99
Stride Time	s	0.61 (0.03)	0.03 (0.01)	0.99	0.98-1.00	0.98-1.00
Gait Speed	m/s	2.30 (0.10)	0.10 (0.03)	0.99	0.98-1.00	0.98-1.00
Stride Length Post-Brace	m	1.41 (0.15)	0.15 (0.05)	0.98	0.97-0.99	0.97-0.99
Stride Time Post-Brace	s	0.61 (0.03)	0.03 (0.01)	0.99	0.98-1.00	0.98-1.00
Gait Speed Post-Brace	m/s	2.30 (0.10)	0.10 (0.03)	0.99	0.98-1.00	0.98-1.00

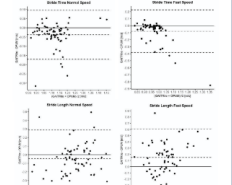


Figure 1. Bland-Altman plots comparing the agreement of parameters measured by the OPUM Digital Knee® and GAITRite® for assessing lower limb gait metrics. The plots show the difference between the two systems (Digital Knee minus GAITRite) on the y-axis and the mean of the two systems on the x-axis. The plots are for Stride Length, Stride Time, and Gait Speed, comparing Digital Knee and GAITRite.

Conclusions

- Stride time was moderately valid (ICC_{2,1} = 0.66), stride length and gait velocity demonstrated poor validity at a comfortable walking speed (ICC_{2,1} = 0.29; 0.41 m/s).
- All gait parameters demonstrated poor validity at a fast walking speed (ICC_{2,1} = 0.16 to 0.01).
- The wearable sensor can be used to measure spatiotemporal gait parameters at comfortable walking speeds.

Future Directions

- This was a laboratory-based study, thus, assessing the device in a real-world environment is warranted.
- Validate the Digital Knee® in patients with knee pathologies.
- A different algorithm is required for fast walking speed in the OPUM Digital Knee®.

References

1. Wang, Y., et al. (2018) Wearable sensors for gait analysis: A review. *Sensors*, 18(12), 4000. <https://doi.org/10.3390/s18124000>

2. Wang, Y., et al. (2019) Wearable sensors for gait analysis: A review. *Sensors*, 19(12), 2800. <https://doi.org/10.3390/s19122800>

3. Wang, Y., et al. (2020) Wearable sensors for gait analysis: A review. *Sensors*, 20(12), 3500. <https://doi.org/10.3390/s20123500>

4. Wang, Y., et al. (2021) Wearable sensors for gait analysis: A review. *Sensors*, 21(12), 3200. <https://doi.org/10.3390/s21123200>

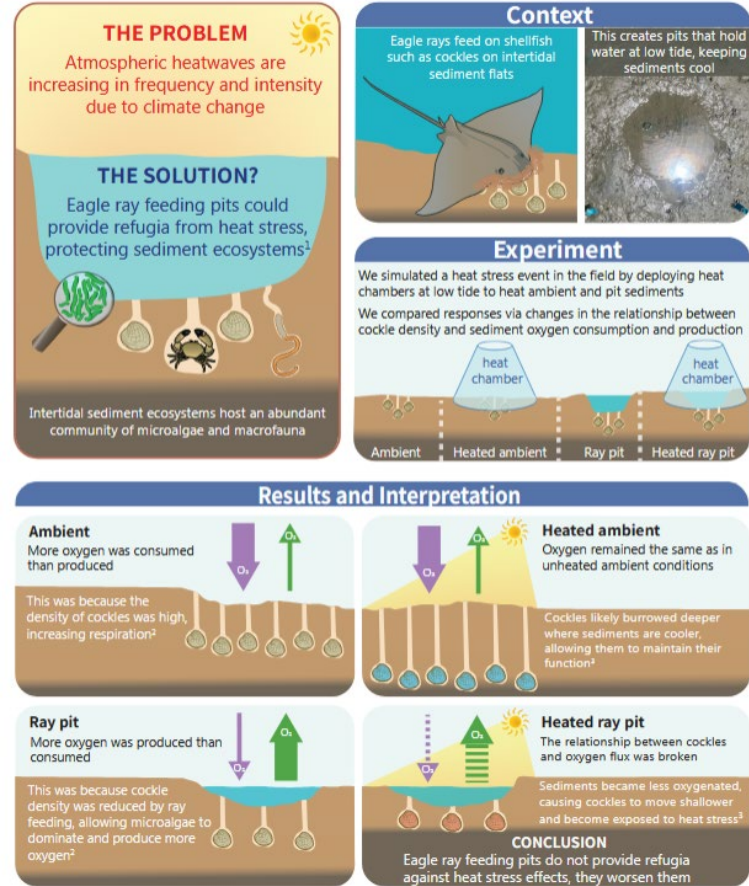
OPUM AUCKLAND

Layout

- Use columns to direct the reader.
- Your layout should be easy to follow with clear signposting or headers to help people navigate.

Could eagle ray feeding pits provide refugia from heat stress in intertidal sediment ecosystems?

Simon Thomas* | Stefano Schenone | Alessandra Vallim | Ines Bartl | Simon Thrush




References

1. Kim, T.-W., Cho, Y.-K. & Deaver, E. P. (2007). An evaluation of the thermal properties and albedo of a macroalgal flat. *J. Geophys. Res. Oceans* 112, C12009.
2. Buitrago, A. et al. (2022). Influence of cockle bioturbation on microphytobenthos primary producers: habitat and density-dependent effects. *Mar. Sci.* 12, 70.
3. Zhou, Z. et al. (2022). Thermal stress affects bioturbators' burrowing behavior: A mesocosm experiment on common cockles (*Cerastoderma edule*). *Sci. Total Environ.* 824, 153621.

Layout


- Experiment with different column layouts to see what works best with your research.
- Consider the different elements you are including – background, methods, results, conclusion, etc.



BRINGING BURROWING SEABIRDS BACK

Integrative Ecological Restoration in Aotearoa New Zealand

Michael R. Fox, School of Biological Sciences



Why Should We Restore Seabirds?

Globally seabirds are one of the most at-risk groups with **1/3 threatened with extinction**¹

Seabirds contribute **\$780M** worth of ecosystem services annually²

Burrowing seabirds (petrels and shearwaters) face a wide variety of threats but **introduced mammalian predators** are the #1 threat³

New Zealand holds the world's highest richness of seabirds, although, the **vast majority** are now only found on **predator-free islands**

Grey-faced petrel / Ōi

Nest in burrows and only lay **one egg per year**

One of the few burrowing seabirds to still breed on mainland New Zealand including the **Waiākare Ranges**

Taonga to northern iwi

Nocturnal—active on land at night

Although not threatened overall, they face **uncertainty** in the face of **climate change**

70% of Earth's land surface has been altered by Humans^{4,5}

1 EVIDENCE BASED MANAGEMENT

Restoring burrowing seabirds through predator control is difficult as we do not know the **relationship** between **predator control, predator abundance, and breeding success**

- I monitored **400 grey-faced petrel / Ōi** breeding attempts and their **success rate** across **14 different colonies**
- Using **trail cameras**, I recorded the diversity and abundance of **predators** (rats and stoats)
- I recorded how many **traps** were around the colonies

Biodiversity target

Identified the **missing predator** where all predators detected are too great for **successful restoration**

Then, I identified the **number of traps** required to **reduce risk** to the biodiversity target

70% of all petrel species are impacted by introduced mammals⁶

2 DISPERSAL ECOLOGY

Dispersal is essential for **species persistence** across a **geographic range**, even in the face of **localised extinction**

Natal philopatry can lead to **isolated populations** and **loss of genetic diversity**

Using **242 mtDNA** sequences and **17,254** banding records, I found that **gene flow** occurs between **geographically isolated populations**

99% of grey-faced petrel breed on the **East Coast**, but the **1%** that breed on the **West Coast** are more **resistant to climate change**^{7,8}

Only **2.8%** of birds banded were seen again

There is **no evidence** of genetic structuring between populations

A statement that might sound like a good **population** response to a **disturbance** event

Only **7 adults** were seen farther than **25 km** from their first banding

More significant is that **16 chicks** have been recaptured **25 km** from their natal colony

Both **genetic** and **banding** data indicate that **long-distance dispersal** in nesting and molting practices can be **implemented** across the geographic range without risk of creating isolated populations

3 SOCIO-ECOLOGICAL

Conservation and restoration do not take place in purely ecological systems—but include **social-ecological systems**

What do community members think the **benefits** and **concerns** of restoring Ōi are?

help population natural areas benefit ecosystem **biodiversity** **resilience** **native** **balance** **reduce** **stoats** **predators** **people** **habitat** **humans**


Participants that recognized Ōi were more **supportive** of habitat management actions for **Ōi restoration**

Effective **conservation** messaging can have a **positive impact** on **Ōi restoration**

These findings suggest that **public restoration campaigns** focused on **Ōi** could **improve support** for **habitat management**

More signage!

Contact: michael.fox@auckland.ac.nz

QR Code: 

Reference:

1. Pimm, S. L. 2001. *World's Most Endangered Species 2001*. New York: IUCN.
2. Pimm, S. L. & Gopal Rao, C. 2000. *World's Most Endangered Species 2000*. New York: IUCN.
3. Jones, K. 2000. *World's Most Endangered Species 2000*. New York: IUCN.
4. Weisner, M. 2004. *World's Most Endangered Species 2004*. New York: IUCN.
5. Weisner, M. 2003. *World's Most Endangered Species 2003*. New York: IUCN.
6. Jones, K. 2002. *World's Most Endangered Species 2002*. New York: IUCN.
7. Jones, K. 2001. *World's Most Endangered Species 2001*. New York: IUCN.

Text

- Use professional fonts that people can read easily.
- Think about the size of your text; title, headings, sub-headings, body, etc.
- Check your spelling and grammar. People will notice errors!

EXPLORING STRATEGIES TO SUSTAINABLY IMPLEMENT NUTRITION GUIDELINES FOR PAEDIATRIC ONCOLOGY IN AOTEAROA NEW ZEALAND



Hannah Fuller¹, Dr Amy Lovell^{1,2},
Dr Sue MacDonell¹, Dr Nina Scott³,
Dr Amy Jones³, Dr Andrew Wood¹,
Dr Claire Gooder¹

¹The University of Auckland
²Te Whatu Ora Te Toka Tumai
³Te Whatu Ora Waikato

Contact: hannah.fuller@auckland.ac.nz

01 BACKGROUND



- Nutritional care for children with cancer lacks standard recommendations and a systematic approach, with there being significant variability in nutrition screening, assessment, intervention, and monitoring practices (1)
- Malnutrition has been shown to reduce chemotherapy tolerance, reduce immunity, increase infection, alter pharmacokinetics, hinder growth and development, and increase the risk of morbidity and mortality (2-4)
- Side effects from treatment, e.g., nausea, vomiting, and pain, can have long-lasting impacts on the food habits of the child and whānau (5-8)



- It is essential that frameworks for implementation exist for clinical guidelines and associated supportive resources to be effectively and sustainably integrated into preexisting healthcare systems (9)

02 AIM

To co-design strategies to support implementing national, evidence-based nutrition guidelines for children and young people diagnosed with cancer in New Zealand using concepts from the He Pikinga Waiora (HPW) implementation framework and the Framework for Effective and Equitable Implementation in Aotearoa (FrEiEA) (10, 11)



03 METHODOLOGY

SEMI-STRUCTURED INTERVIEWS

Health professionals from each of the 16 centres for childhood cancer across NZ:

- Understand unique organisational considerations
- Gather ideas around feasible strategies/tools

With whānau and health professionals:

- Map the current state of the system
- Gain insight into what tools are needed and wanted

WĀNANGA



SURVEY



The research team will refine ideas for an implementation toolkit specific to each centre's needs. Health professionals and whānau will be invited to complete a survey to provide additional feedback

04 IMPACT



This study will provide a structured approach for embedding evidence-based nutrition guidelines into paediatric oncology practice, which will address systemic barriers to uptake and ensure sustainability. The use of the HPW framework and the FrEiEA will increase the delivery of equitable healthcare and provide communities with the ability to shape health interventions to meet their needs.

05 FRAMEWORKS



HPW (10): Kaupapa Māori, cultural centredness, community engagement, systems thinking, integrated knowledge transfer.

FrEiEA (11): Te Tiriti o Waitangi.
Focus: Whānau.

Core constructs: Collaborative design, anti-racism, Māori and priority population expertise, cultural safety and values-based.

Contextual factors: Social, economic, commercial and political factors.
Implementation pathway: Implementation planning, designing the implementation pathway, implementation monitoring, outcomes and evaluation.

06 LINKS



References



HPW



FrEiEA

96 Font } Title

48 Font } Headings
36 Font }

24 Font } Sub-headings
20 Font }
18 Font }

16 Font } Body
14 Font }
12 Font }
10 Font }

1000 words

Introduction

According to the French historian Max Gallo, "for over two hundred years, posters have been displayed in public places all over the world. Visually striking, they have been designed to attract the attention of passers-by, making us aware of a political viewpoint, enticing us to attend specific events, or encouraging us to purchase a particular product or service."^[1] The modern poster, as we know it, however, dates back to 1870 when the printing industry perfected colour lithography and made mass production possible.

"In little more than a hundred years", writes poster expert John Barnicoat, "it has come to be recognized as a vital art form, attracting artists at every level, from painters like Toulouse-Lautrec and Mucha to theatrical and commercial designers."^[2] They have ranged in styles from Art Nouveau, Symbolism, Cubism, and Art Deco to the more formal Bauhaus and the often incoherent hippie posters of the 1960s.

Mass production

Posters, in the form of placards and posted bills, have been used since earliest times, primarily for advertising and announcements. Purely textual posters have a long history: they advertised the plays of Shakespeare and made citizens aware of government proclamations for centuries. However, the great revolution in posters was the development of printing techniques that allowed for cheap mass production and printing, including notably the technique lithography which was invented in 1796 by the German Alois Senefelder. The invention of lithography was soon followed by chromolithography, which allowed for mass editions of posters illustrated in vibrant colours to be printed.

Developing art form

By the 1890s, the technique had spread throughout Europe. A number of noted French artists created poster art in this period, foremost amongst them Henri de Toulouse-Lautrec, Jules Chéret, Eugène Grasset, Adolphe Willette, Pierre Bonnard, Louis Anguétin, Georges de Feure and Henri-Gabriel Ibels.^[3] Chéret is considered to be the "father" of advertisement placards. He was a pencil artist and a scene decorator, who founded a small lithography office in Paris in 1866. He used striking characters, contrast and bright colours, and created over 1000 advertisements, primarily for exhibitions, theatres, and products. The industry soon attracted the service of many aspiring painters who needed a source of revenue to support themselves.

Chéret developed a new lithographic technique that suited better the needs of advertisers: he added a lot more colour which, in conjunction with innovative typography, rendered the poster much more expressive. Not surprisingly, Chéret is said to have introduced sex in advertising or, at least, to have exploited the feminine image as an advertising ploy. In contrast with those previously painted by Toulouse-Lautrec, Chéret's laughing and provocative feminine figures meant a new conception of art as being of service to advertising.

Posters soon transformed the thoroughfares of Paris into the "art galleries of the street." Their commercial success was such that some of the artists were in great demand and theatre stars personally selected their own favorite artist to do the poster for an upcoming performance. The popularity of poster art was such that in 1884 a major exhibition was held in Paris.

Commercial uses

Lithograph poster for Ranch 10, a Western-themed play by Harry Meredith which opened in New York City in August 1882.

By the 1890s, poster art had widespread usage in other parts of Europe, advertising everything from bicycles to bouillabais. By the end of the 19th century, during an era known as the Belle Époque, the standing of the poster as a serious artform was raised even further. Between 1895 and 1900, Jules Chéret created the *Maîtres de l'Affiche* (Masters of the Poster) series that became not only a commercial success, but is now seen as an important historical publication. Alphonse Mucha and Eugène Grasset were also influential poster designers of this generation, known for their Art Nouveau style and stylized figures, particularly of women. Advertisement posters became a special type of graphic art in the modern age. Poster artists such as Theophile Steinlen, Albert Guillaume, Leonetto Cappiello, Henri Thiriet and others became important figures of their day, their art form transferred to magazines for advertising as well as for social and political commentary.

In the United States, posters did not evolve to the same artistic level. American posters were primarily directed towards basic commercial needs to deliver a written message. However, the advent of the traveling circus led to colourful posters to tell citizens that a carnival was coming to town. But these too were very commercially utilitarian, of average quality, and few saw any real artistic creativity.

Many posters have had great artistic merit and have become extremely collectible. These include the posters advertising World's Fairs and Colonial Exhibitions.

Political uses

A framed poster displaying the national motto of the United States, "In God We Trust," in a New Philadelphia High School classroom.

Other times of great turmoil also produced great posters. The 1960s is the rise of pop art and protest movements throughout the West, both made great use of posters. Perhaps the most acclaimed posters were those produced by French students during the so-called "événements" of May 1968. During the 1968 French student riots and for years to come, Jim Fitzpatrick's stylized poster of Marxist revolutionary Che Guevara (based on the photo Guerrillero Heroico), also became a common youthful symbol of rebellion.^[4]

After the September 11 attacks, public schools across the United States posted "In God We Trust" framed posters in their libraries, cafeterias and classrooms.^[5] The American Family Association supplied several 11-by-14-inch posters to school systems.^[5]

Poster printing

Many printing techniques are used to produce posters. While most posters are mass-produced, posters may also be printed by hand or in limited editions. Most posters are printed on one side and left blank on the back, the better for affixing to a wall or other surface. Pin-up sized posters are usually printed on A3 Standard Silk paper in full colour. Upon purchase, most commercially available posters are often rolled up into a cylindrical tube to allow for damage-free transportation. Rolled-up posters can then be flattened under pressure for several hours to regain their original form.

500 words

Introduction

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Developing art form

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Chéret developed a new lithographic technique that suited better the needs of advertisers: he added a lot more colour which, in conjunction with innovative typography, rendered the poster much more expressive. Not surprisingly, Chéret is said to have introduced sex in advertising or, at least, to have exploited the feminine image as an advertising ploy. In contrast with those previously painted by Toulouse-Lautrec, Chéret's laughing and provocative feminine figures meant a new conception of art as being of service to advertising.

Posters soon transformed the thoroughfares of Paris into the "art galleries of the street." Their commercial success was such that some of the artists were in great demand and theatre stars personally selected their own favorite artist to do the poster for an upcoming performance.

300 words

Introduction

According to the French historian Max Gallo, "for over two hundred years, posters have been displayed in public places all over the world. Visually striking, they have been designed to attract the attention of passers-by, making us aware of a political viewpoint, enticing us to attend specific events, or encouraging us to purchase a particular product or service."^[1] The modern poster, as we know it, however, dates back to 1870 when the printing industry perfected colour lithography and made mass production possible.

"In little more than a hundred years", writes poster expert John Barnicoat, "it has come to be recognized as a vital art form, attracting artists at every level, from painters like Toulouse-Lautrec and Mucha to theatrical and commercial designers."^[2] They have ranged in styles from Art Nouveau, Symbolism, Cubism, and Art Deco to the more formal Bauhaus and the often incoherent hippie posters of the 1960s.

Mass production

Posters, in the form of placards and posted bills, have been used since earliest times, primarily for advertising and announcements. Purely textual posters have a long history: they advertised the plays of Shakespeare and made citizens aware of government proclamations for centuries. However, the great revolution in posters was the development of printing techniques that allowed for cheap mass production and printing, including notably the technique lithography which was invented in 1796 by the German Alois Senefelder. The invention of lithography was soon followed by chromolithography, which allowed for mass editions of posters illustrated in vibrant colours to be printed.

Developing art form

By the 1890s, the technique had spread throughout Europe. A number of noted French artists created poster art in this period, foremost amongst them Henri de Toulouse-Lautrec, Jules Chéret, Eugène Grasset, Adolphe Willette, Pierre Bonnard, Louis Anguétin, Georges de Feure and Henri-Gabriel Ibels.^[3]

Replace text with:

- Pictures
- Maps

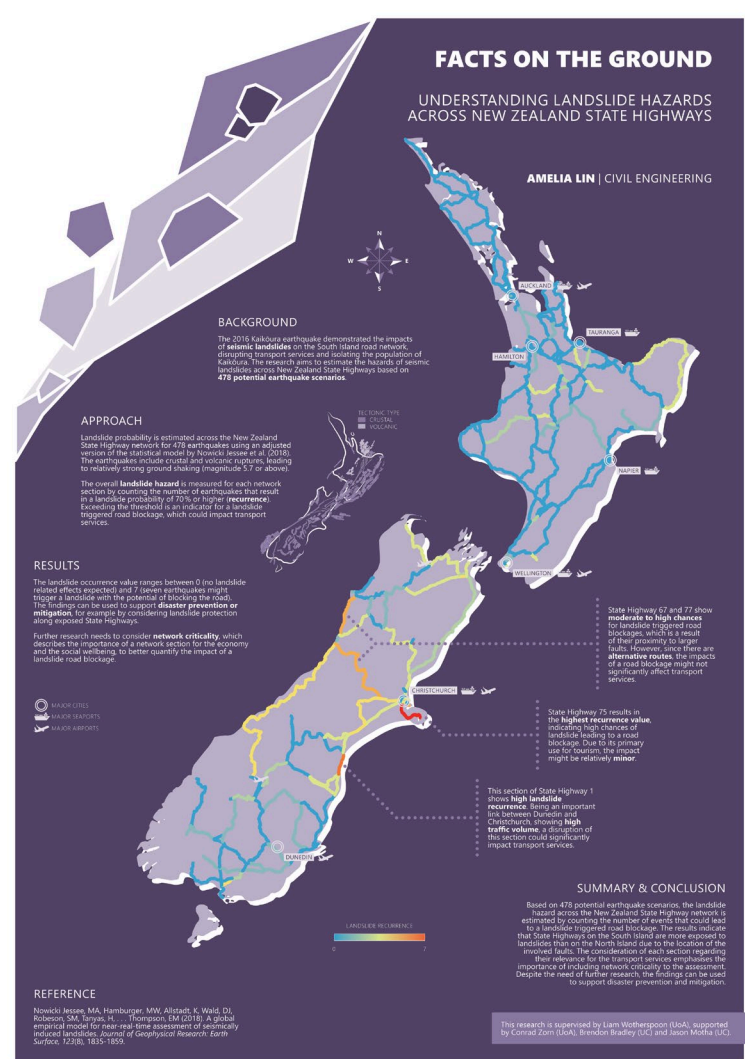


Image resolution



Replace text with:

- Diagrams
- Graphs
- Flowcharts
- Timelines

Are hihi affected by inbreeding?

Modern genetic tools reveal inbreeding status for the threatened hihi of Aotearoa New Zealand



Laura Duntsch¹ - Anneli Whibley² - Sarah Bailey² - Patricia Brekke² - John G. Ewen² - Anna W. Santure²
¹School of Biological Sciences, University of Auckland, Auckland, New Zealand
²Institute of Zoology, Zoological Society of London, Regents Park, London, United Kingdom

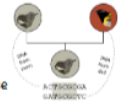
INTRODUCTION

Once abundant across the North Island, hihi now can only be found in a single remnant population and seven additional pest-free sanctuaries. Hihi are important **plant pollinators** but extremely **vulnerable** to all predators and competitors.



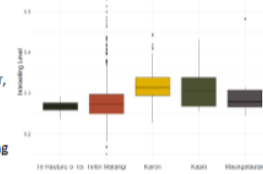
METHODS

We used hihi genomic data to infer **individual levels of inbreeding** for hihi from five populations. Inbreeding is caused by mating between close relatives, and revealed by **low variation** in the genome of an individual.



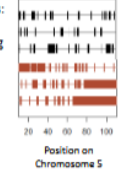
RESULT 1

Birds in the **remnant population** and in the **largest translocated population** are overall less inbred than smaller, **older** translocated populations. However, **Tiritiri Matangi** has a wide range of inbreeding levels.



RESULT 2

A closer look reveals: individuals with high total inbreeding have less variation across their chromosomes (**bottom 3 birds**) compared to those that are less inbred (**top 3 birds**).



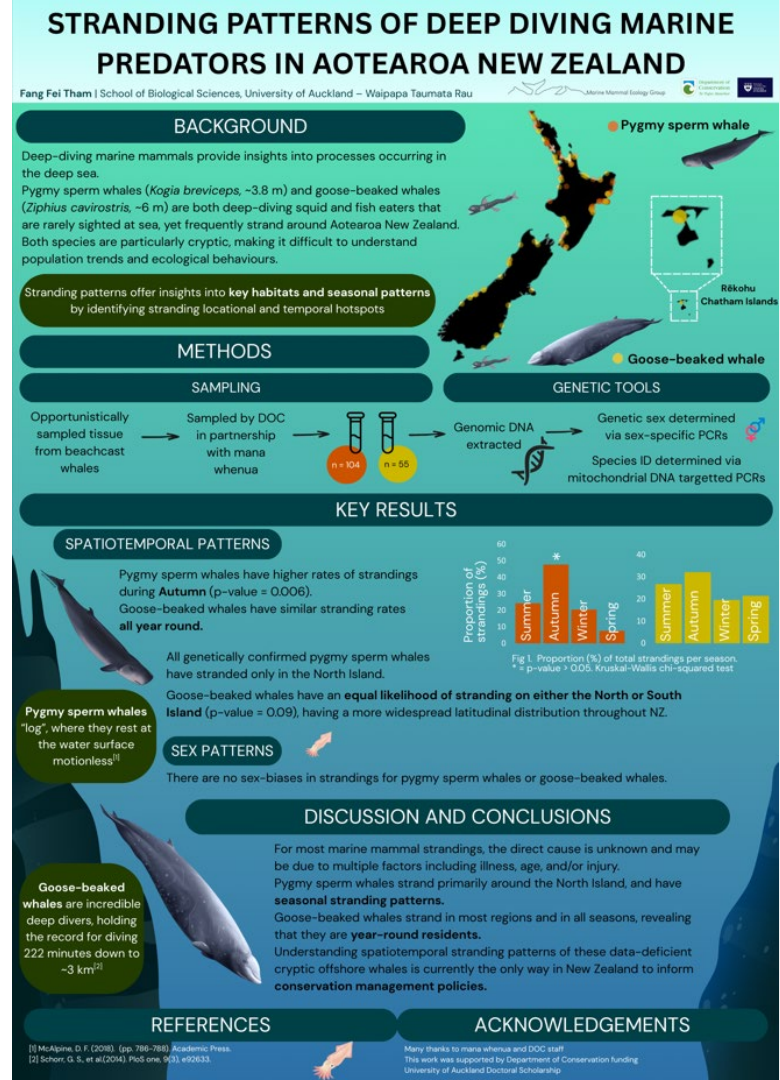
CONCLUSION

We find that small, older translocated hihi populations such as **Karori** (Zealandia) and **Kapiti** Island have **higher inbreeding levels** than the much larger population on **Tiritiri Matangi** and the more recently established population in the Maungatautari sanctuary. Hihi inbreeding levels are **comparable to other bird species** of conservation concern, such as the Hawaiian Crow ('Alala).



Colour

- Think about a colour that best represents your research.
- Is your research a “warm” topic? Use red, orange, yellow, etc.
- Or does it feel “cold”? Use blue, green, purple, etc.



Colour

Some colour combinations make text difficult to read

Some colour combinations make text difficult to read

Some colour combinations make text difficult to read

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Colour

Pick colour combinations that make text easy to read

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Pick colour combinations that make text easy to read

Pick colour combinations that make text easy to read

Examples

- [Figshare](#)
- [F1000 posters](#)

Examine the examples and think about:

- Do you understand the content?
- Do you like the design?
- Any thoughts for improvements?



Stitch-iiing! together conservation and genomics

How a very special bird from Aotearoa is giving us insights into its conservation but also population genomics and the challenges faced by small populations

Hui Zhen Tan^{1,2}, Katarina C. Stuart^{1,3}, Joseph Guhlin⁴,
Tram Vi^{1,2}, Selina Patel¹, Laura Duntsch⁵, Patricia Brekke⁶,
John G. Ewen⁶, Anna W. Santure^{1,2}

1. Department of Conservation, 2. Department of Statistics, 3. Department of Biology, 4. Department of Ecology and Evolutionary Biology, 5. Department of Zoology, 6. Department of Biology, University of Canterbury

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What is conservation genomics?

- genomic management of populations to maximise genomic diversity and minimise inbreeding to promote long-term survival
- genomics looks at information from the entirety of the genome – higher resolution and precision compared to previous methods

Inbreeding: the whys and hows

- affects fertility and survival within populations
- individuals inherit identical genome sections from common ancestor, creating runs of homozygosity (ROH)
- long ROHs harbour harmful mutations
- more inbred = higher FROH (inbreeding coefficient)



About the hihi / stitchbird (*Notiomystis cincta*)

- forest bird found only in Aotearoa New Zealand
- suffered drastic population declines and now exist in 1 remnant population and 7 managed sites – population bottlenecks!
- reproductive success data and pedigree available from long-term monitoring by dedicated conservation officers and volunteers



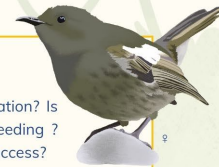
Methods

- analysed genome-wide DNA from 401 birds over 2 decades on Tiritiri Matangi (largest reintroduced pop.)
- quantified ROH and its relationship with fitness



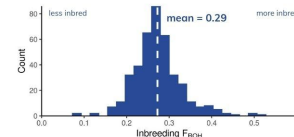
Research questions

- What are the inbreeding levels and how does it vary within a population? Is
- there evidence of inbreeding depression where fitness ↓ with ↑ inbreeding?
- Are there regions in the genome associated with lifetime reproductive success?



Results

moderate inbreeding levels

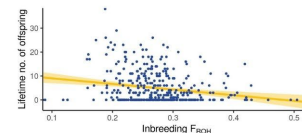


- moderate inbreeding on Tiritiri Matangi
- individuals vary in inbreeding levels

genes associated with reproductive success

- 161 sites in genome where genotypes are significantly associated with reproductive success
- Genes found in those sites e.g.:
 - KIAA1462 – impacts egg laying performance
 - CHN2 – territorial aggression
 - TJP1 – reduced sperm storage efficiency

evidence for inbreeding depression



- genomic inbreeding highly significant predictor for lifetime reproductive success
- more inbred individuals have fewer offspring (lower fitness)

Summary & next steps

- provides support to explore genetic exchange between populations
- investigate inbreeding levels & fitness in other populations e.g. Zealandia

Acknowledgements
Department of Conservation, Genomics Aotearoa, Hihi Recovery Group, Marsden Fund, Ministry of Business Innovation & Employment, New Zealand eScience Infrastructure, Ngāi Māorihuri Settlement Trust, Support of Tiritiri Matangi, University of Auckland, Craig D. Miller, Kate D. Lee, Elizabeth Parata, Emma Gray, Mhairi McCready, Phoebe Scherer, Pierre de Vriesmont, Sarah Balser, Taha Hochreiter

The Sky's Door is Opened for You

Aspects of Astronomy in the Ancient Egyptian Pyramid Texts

Despite the "Birth of Astronomy" being linked to Ancient Greece, cultures such as those in Egypt, China, India and Mesopotamia were developing astronomical systems and constructing astronomical texts much earlier.

Elizabeth Leakey
<http://www.egyptology.com>



And yet, much of scholarship only validates the astronomical traditions of Greece and Rome.


~2326 BC
THE PYRAMID TEXTS are one of the world's oldest astronomical texts. They represent a complex corpus of mythological and scientific understanding that was present in Egypt's Old Kingdom (2600-2150 BC). Studying the Pyramid Texts and looking for references to astronomy helps us understand this science.

Sp-pd-dm, you have taken to yourself every god... that you may make more of them in the starry sky, lest they depart from you at death (PT 641B, 747C, 749C, 810, 811)

The Pyramid Texts are possibly the most discussed piece of ancient Egyptian literature, but they are rarely considered through an archaeoastronomical lens.

Archaeoastronomy is the "science of stars and stones", it considers the astronomical traditions of civilizations and the ways in which they interacted with the sky. Reading the Pyramid Texts while keeping archaeoastronomical practice in mind is the best way to identify astronomical information.

Archaeoastronomy is a relatively small subfield, especially in Egyptology. Scholars like R.O. Faulkner (1966) and Alicia Maravilla (2018) have published articles on astronomy in the Pyramid Texts, but Rolf Krauss has written the only monograph: *Astronomische Konzepte und Jenseitsvorstellungen in den Pyramidentexten*, his 1997 post-doc thesis. Outside of this small sample, there is a noticeable dearth of publications on the Pyramid Text's astronomical data. This research project aims to fix that.



The Pyramid Texts reference complex astronomical concepts such as circumpolar stars (stars that orbit the celestial pole and so never set) and heliac risings (the first appearance of a star before sunrise), as well as alluding to other astronomical traditions such as the development of a corpus of constellations and tensions within the calendrical systems. They indicate that ancient Egyptian astronomy was a thriving science in the 3rd millennium BC, and that people were engaging with the night sky.



ⲛⲓⲥ
 'star'

In the Pyramid Texts, stars feature heavily both as objects, and symbols of divinity.

In the Tomb of Nankikhum and Khnumhotep, it appears in this market scene as a "dialogue" being spoken by one of the merchants. This piece of art reflects daily life around 50 years before the inscription of the Pyramid Texts. What conversations were people having about stars in a marketplace? What does this tell us about astronomy as a part of daily life?

ⲛⲓⲥⲱ
 'god of the moon'

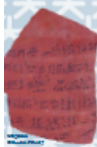
In the Pyramid Texts, Khonsu is an incredibly aggressive lunar deity, in contrast to his later depictions. Khonsu, who slaughters the lords, outs their throats... (PT 273 & 402)

Why is the god of the moon so aggressive in the Pyramid Texts? Is it because Egypt was transitioning from a lunar to a solar calendar at around the same time, making the god of the moon fall out of favour? What can this version of Khonsu teach us about the ancient Egyptians' relationship with time?



These words are just two examples of the plethora of questions that can be raised by reading the Pyramid Texts through an archaeoastronomical lens. As this project progresses, I expect to be able to use the Pyramid Texts to build a "textbook" of ancient Egyptian astronomical knowledge as of 2500 BC.

Using examples such as these, this project aims to defend ancient Egyptian astronomy, conceptualising it as a result of the scientific method, filtered through a mythic and religious worldview.



The astronomical concepts of the Pyramid Texts resonate through the literature, art, and architecture of ancient Egypt. Features of ancient Egyptian culture such as the myth of the Secret Name of Ra, the astronomical ceilings of the Ramessids, and the sunrise syzygy at Karnak are all informed by the astronomical traditions of the Old Kingdom. These traditions are a valid science, and as such deserve to be studied and understood.

FLEXING OUR MUSSELS: RESTORING NEW ZEALAND'S WILD INTERTIDAL MUSSEL REEFS

Trevyn Toone^{1,2}, Emilee Benjamin^{1,2}, Sean Handley², Jenny Hillman¹, Andrew Jeffs¹

¹University of Auckland Institute of Marine Science, ²National Institute of Water and Atmospheric Research

BACKGROUND

- Shellfish like oysters and mussels can build **complex reefs** that filter water, create habitats, and stabilize the seafloor (Grabowski et al., 2012)
- Shellfish reefs have globally **severely declined** in recent history (Beck et al., 2009)
- Restoration projects attempt to address these losses with **mixed results** (Fitzsimmons et al., 2020)
- The intertidal zone, or the area exposed on low tides but covered on high tides, has seen **very low survival** in traditional restoration efforts (de Paoli et al., 2015)
- We restored mussel reefs in an area with low predator abundance and high wave protection to test **whether successful intertidal restoration is possible**

Mussels can join to form dense reefs!



METHODS

- Study took place at the **top of New Zealand's South Island**
- **5 tonnes** of adult mussels from aquaculture farms were restored to the seafloor
- Half of mussels were restored **intertidally** and half **subtidally** but they were restored at the same times, places, and from the same sources
- Mussels are monitored every three months for **survival, growth, and health**



Mussels were restored at three sites at the top of New Zealand's South Island

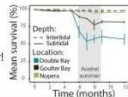
As the tide rises, it covers the restored intertidal mussels



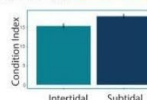
RESULTS

- After one year the subtidal mussels showed **very high survival!**
- The intertidal mussels had **high survival at one location**, but many died of **heat stress** at the other two locations
- Subtidal mussels **grew faster** than intertidal and appear to be slightly healthier

Almost all mortality occurred during the summer!



Condition index is a way to measure mussel health!



CONCLUSIONS

- To our knowledge this is the **first restoration of intertidal mussels at this scale with high survival**
- Intertidal restoration is possible as long as stress like predation, wave action, and heat is avoided
- While intertidal restoration is cheaper and easier, subtidal restoration may still result in healthier, larger mussels, so managers should decide based on their goals and resources

A successful restored intertidal mussel reef!



Subtidal mussels appear to be healthier and grow faster!

FUTURE RESEARCH

- We will continue monitoring these restored reefs to see if any **baby mussels** arrive!
- Research into different benefits from intertidal and subtidal mussels will impact future work
- Eventually, we hope to restore mussels intertidally and subtidally at a **larger scale!**

Intertidal and subtidal mussels may form different kinds of habitats!

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I'd love to hear from you!

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🐦 @trevytoone

🌐 trevyntoone.com

Reach out to me!

Or see more about the project here!



Structural Resilience and Functionality Implications of Designing to Various International Standards

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The University of Auckland | nbuc77@aucklanduni.ac.nz

01 | CASE STUDY BUILDING

A reinforced concrete (RC) moment frame building designed to Japanese standards was selected as the case study building. The structure is a full scale 10-story building tested at the E-Defense shake table facility in Japan in 2016.

The structure has plan dimensions of 12m x 8m and is 25.75m tall. The lateral force resisting system consists of two 3-bay perimeter moment frames in the longitudinal (L) direction.

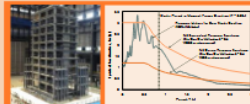


Figure 1 | 10-story RC moment frame building tested at the E-Defense shake table facility in Japan (Shimizu et al. 2017) and Department of Earthquake Engineering, NAGCE, Sendai, Japan.

03 | NONLINEAR MODEL

A nonlinear 2D model of the case study building moment frame was created in OpenSees and validated with results from E-Defense shake table tests. The beams and columns of the moment frame are modelled with fibre sections combining steel, unconfined, and confined concrete material.

Beam-column joints are modelled with rigid end offset lengths based on beam to column strength ratio. The nonlinear model will be used to conduct a probabilistic structural response assessment (PSRA) for each building design considering a range of hazards for Wellington.

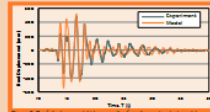


Figure 2 | Time history of ground motion. The observed time history record compared to results from E-Defense shake table tests with 10% NSD scale amplification.

04 | LIFE CYCLE COST EVALUATION

Results from the PSRA will be used to conduct post-earthquake loss assessments for each building design using the FEMA D-58 Performance Assessment Calculation Tool (DACT) to provide estimates for annual losses in terms of repair cost. DACT uses a fragility-based approach to estimate damage to structural and non-structural components.

The life cycle cost for each design will be calculated as the total construction cost plus any additional repair costs.

EXPECTED RESULTS & FUTURE WORK

The building functionality of each design will be quantified using the proposed risk-based approach that relates component-level damage to building-level function. Results from the loss assessment will be used to update the functionality assessment framework by identifying which non-structural components are most likely to impact building functionality based on their sensitivity to damage. The results from the loss and functionality assessment will be used to provide recommendations for potential design strategies currently used in other countries that would improve the resilience of concrete structures in New Zealand.

OBJECTIVE

This research compares the seismic performance of reinforced concrete buildings designed to various international codes in terms of economic loss and functionality as a way to improve the resilience of structures designed in New Zealand.

APPROACH

The framework is developed through the design and assessment of four 10-story concrete moment frame buildings designed using New Zealand material properties and seismic hazard but with design procedures and detailing requirements based on New Zealand, United States, Japanese, and Chilean standards, respectively.

02 | MOMENT FRAME DESIGN

The case building is re-designed in the moment frame direction following New Zealand, United States, Japanese, and Chilean standards with columns designed as rectangular and beams designed as T sections.

The moment frames are designed for the demands on a structure located in Wellington, NZ (Cs0-A) with site class D soil conditions. All designs use New Zealand material properties for concrete and steel reinforcement. Larger design demands and a focus on limiting drift can result in buildings that are more elastic and have longer beams and columns, as is typically the case with Japanese and Chilean moment frame building.

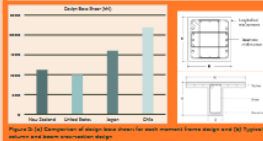


Figure 3 | Comparison of design base shear for each moment frame design (NZ Typical moment and beam reinforcement layout).

05 | RISK-BASED FUNCTIONALITY ASSESSMENT

Finally, a risk-targeted approach will be used to assess the post-earthquake functionality level of each building design. An initial framework has been developed that provides a scaled functionality risk of each non-structural component in terms of building safety, building access, and tenant function.

These results will be compared to the results from the loss assessments and the framework will be adjusted based on non-structural components that had that greatest impact on the lifecycle cost of the building.



Figure 4 | Proposed Losses by Performance Design for an NZ Standard moment frame with representative column perimeter and corner occupancy Losses (Building Safety).

REFERENCES

Bluck, N., Clarke, G., Stephens, M., Hogan, L., Clarke, G., Bluck, N., et al. (2017) 2016 Three-dimensional Shaking Table Test of a 10-Story Reinforced Concrete Building on the E-Defense 6m x 6m Shake Table for Earthquake Engineering, NAGCE, Sendai, Japan.



MATAI TREE-TMENT

Lignan in the Heartwood of Healing

School of Chemical Sciences

Keely Bowler, Brent Copp, David Barker

BACKGROUND

Plants have been used as inspiration for making new medicines for a long time. A popular example is the discovery of aspirin (salicylic acid) from a similar compound – salicin – found in willow bark.

Lignans are a specific class of compounds found in all plants that are well known to have a range of biological activities in humans.^{1,2} Thus, they offer a lot of value for scientists when developing new pharmaceuticals.

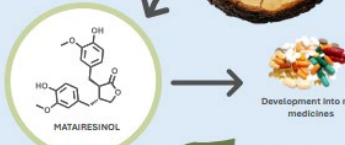
New Zealand has a vast variety of native plants that each contain different lignans to offer as potential medicines. One notable example is Matairesinol, which was found in the matai tree here in New Zealand in 1910.⁴



MATAIRESINOL

Matairesinol has been found to have anticancer and anti-inflammatory activity,^{3,6} and has not been found in any other plants in the world in substantial amounts.

This project will aim to extract matairesinol from the matai tree. Extracted matairesinol will be modified and these derivatives will be tested for their potential as medicinal compounds.



Development into new medicines

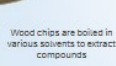
METHOD

1



Matai wood is turned into chips

2



Wood chips are boiled in various solvents to extract compounds

3



Matairesinol is purified out from the mixture of compounds

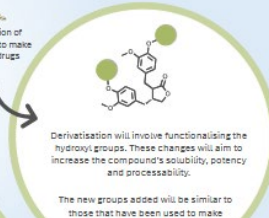
4



Derivatization of matairesinol to make drugs/products

5

Compounds made are tested for activity



TIKANGA MĀORI

TIKA = 'right' or 'correct'

TIKANGA MAORI = 'The right way of doing something'

Because matai is a native New Zealand plant it is a taonga (treasured) species we will consider the tikanga of how we source, harvest and handle the plant material. This will ensure:

- The matai is respected as taonga
- Its use will be sustainable to allow its resources to be available for future generations

SUMMARY

This project will appropriately obtain matai wood in accordance with tikanga. Matairesinol will then be extracted from any wood acquired and subsequently derivatised to create a new generation of bioactive molecules

ACKNOWLEDGEMENTS

We thank Heartland Timbers NZ for the supply of matai wood and the University of Auckland for funding, including a doctoral scholarship

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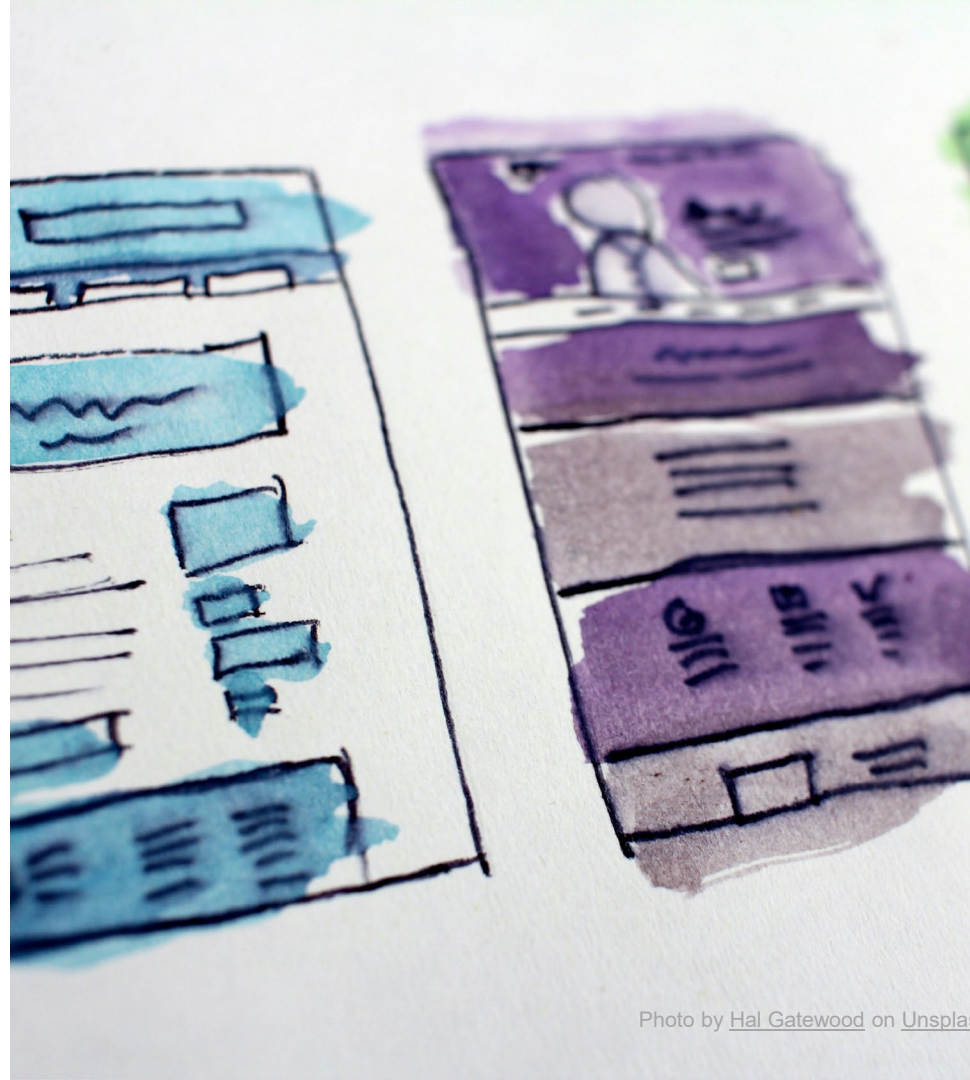
Software & Resources



Photo by [Steve Johnson](#) on [Unsplash](#)

What software are you familiar with?

- Adobe – Illustrator, Photoshop, InDesign
- Canva
- Microsoft Powerpoint
- Microsoft Publisher (retiring Oct 2026)
- Inkscape
- Poster Genius - \$\$\$



Printing

- Warehouse Stationery
- Local Print Shop
- Are there specific sizing requirements needed for your poster?



Where can I find images?

- [Unsplash](#)
- [Pixabay](#)
- [Pexels](#)
- [Britannica ImageQuest](#) (access through Libraries & Learning Services databases)
- [Noun Project](#) (for icons)



Entering a competition?

- Become familiar with the judging criteria.
- [SGS Research Showcase](#) academic poster category marking rubric.

Poster Competition - Judging Criteria

Poster number

The key with this poster presentation is to strike a balance between academic content and presentation of the work to a broad audience.

Subcategory	Details	Score
Academic Content	Context / Background: How well does the poster explain the background, context and aims / objectives of the research? How effectively does the entrant explain the importance of the research?	/10
	Is there a critical engagement with literature / other research in the field?	/10
	Methods: How effectively does the methodology emerge from the poster?	/10
	Conclusions: How effectively are the conclusions of the research discussed? How well does the poster explain the research outcomes expected?	/10
	Subtotal	/40
Design	Presentation: Is the poster well structured, and is its message conveyed in a coherent and competent manner? Does the poster catch – and keep – the viewer's attention?	/10
	Creativity: How innovative, creative and effective is the poster?	/10
	Subtotal	/20
Appeal to a Broad Audience	Comprehension: How well are the main concepts explained to a broad audience?	/10
	Appeal: How effectively does the poster provoke thoughtful insight and/or questions for viewers?	/10
	Language: How well does the entrant use language to appeal to a broad audience? Are technical terms understandable and accessible to a general audience?	/10
	Impact: How well does the poster explain the potential benefit of the research beyond academia?	/10
	Subtotal	/40
	Total	/100

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Questions?



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Feedback

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