



Waipapa
Taumata Rau
**University
of Auckland**

Design 101: Presentations, Posters, and PowerPoints for Researchers



June 30th 2026



Li Wang & Ana Avilés



Why is design important to you?

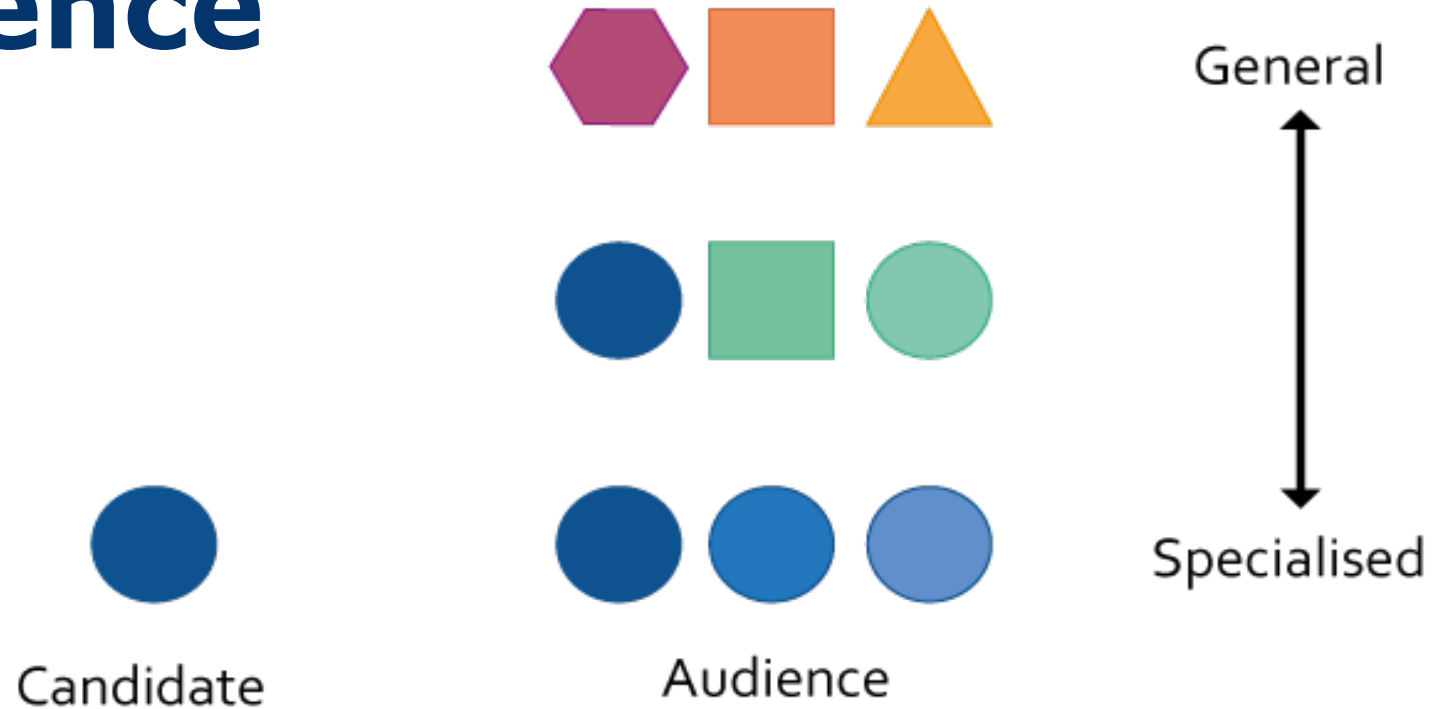


Know your audience

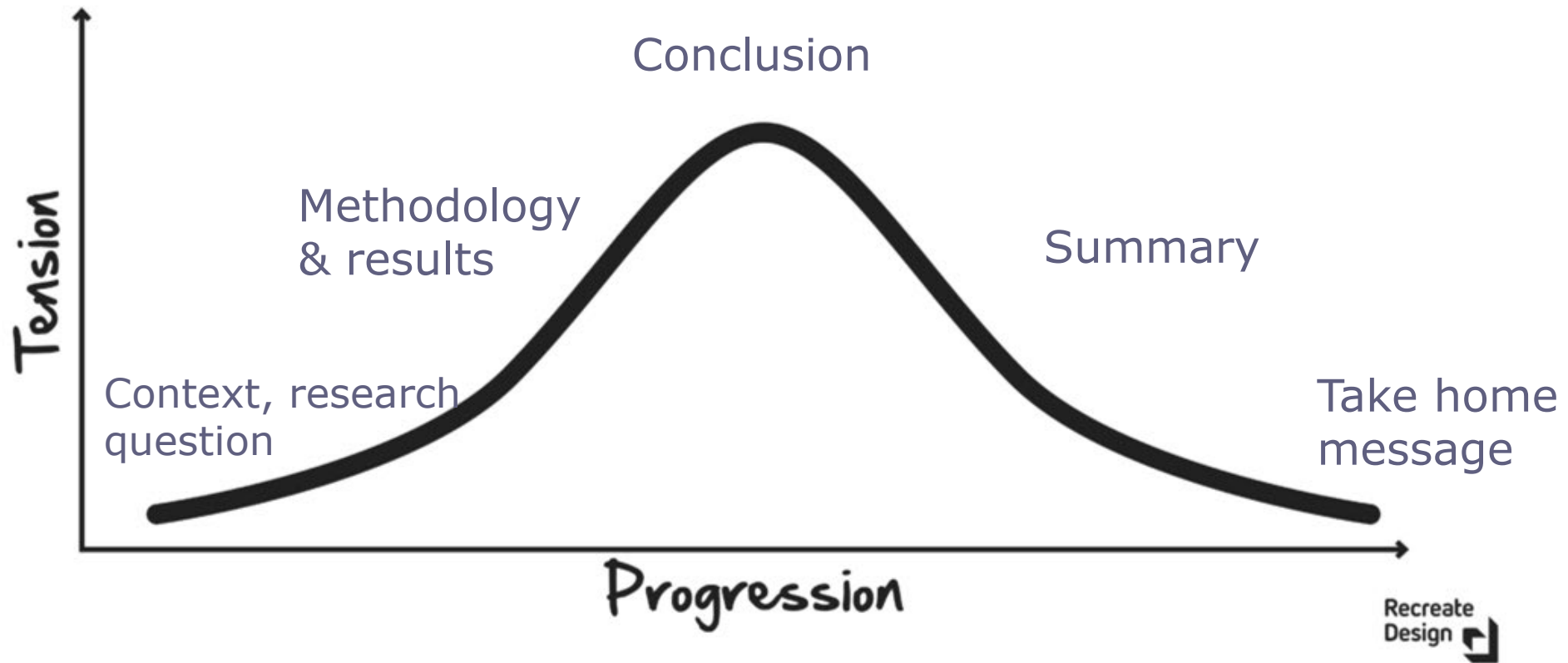
- Where will you use this?
- What are you trying to achieve?
- Who will see it?
- What do they already know?
- Why do they care?
- What's your **key message**?



Know your audience



Structure follows a narrative arc



Questions so far?



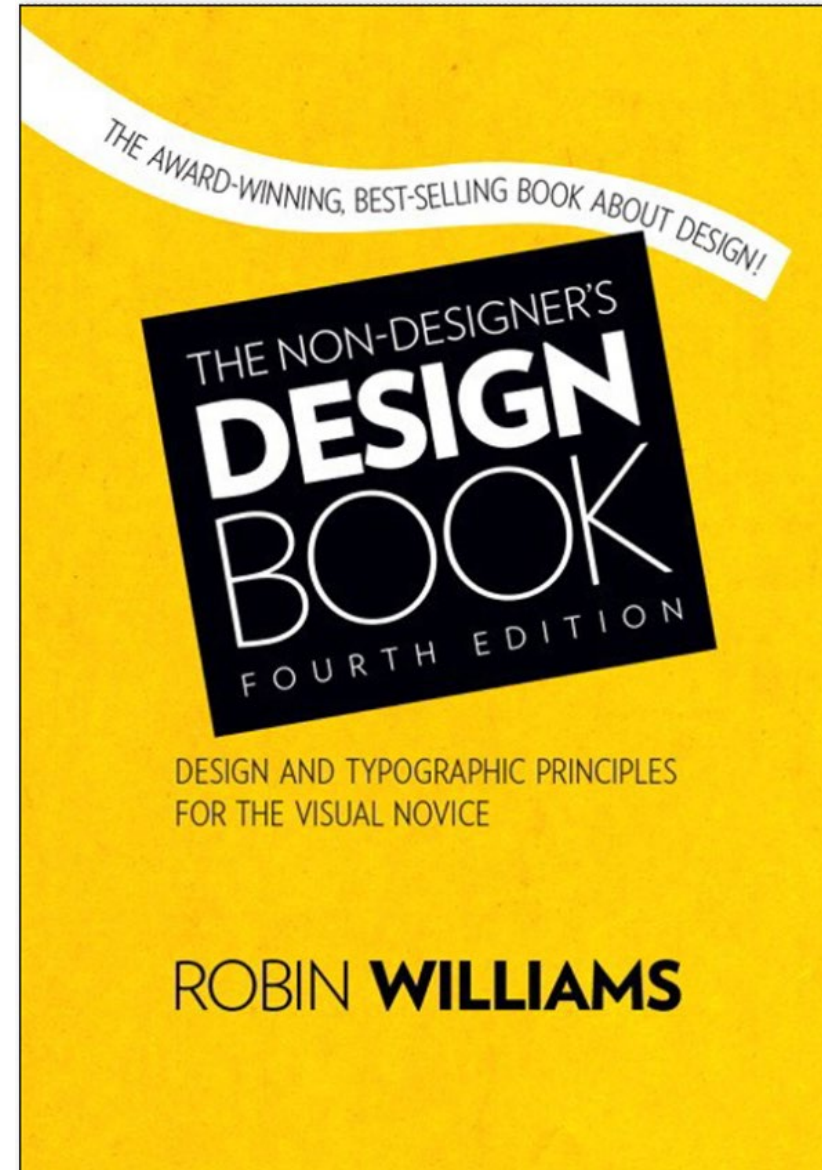
Basic principles of good design

Proximity

Alignment

Repetition

Contrast




Williams, R. (2014). *The Non-Designer's Design Book* (4th ed.). Berkeley, California: Peachpit Press

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.



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.



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.



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.
- 41% self identified as having some level of seismic strengthening.
- 70% are two-story houses, which exclude them of the scope of the EQPB provisions.

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

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 vary from engineered solutions to builder and owners instigated ideas.



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.

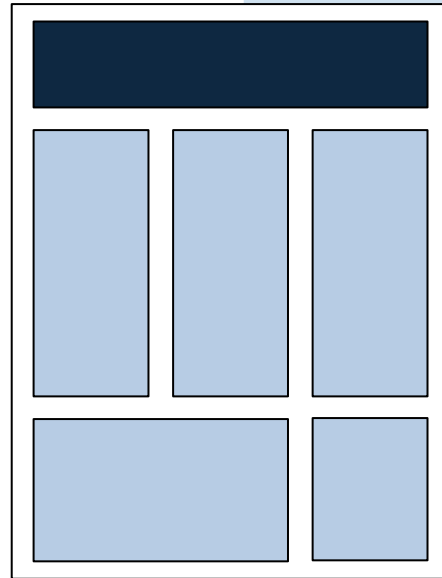
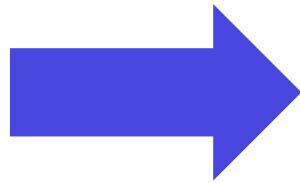
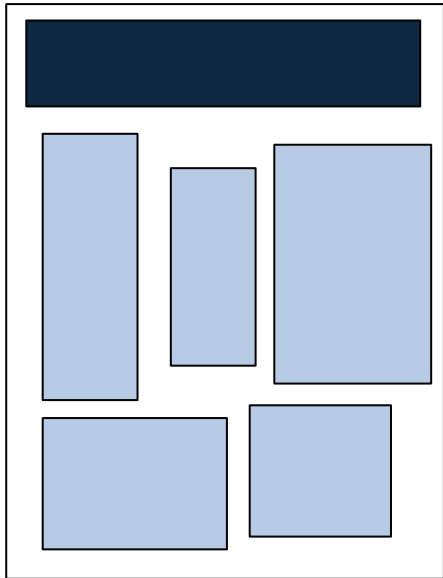
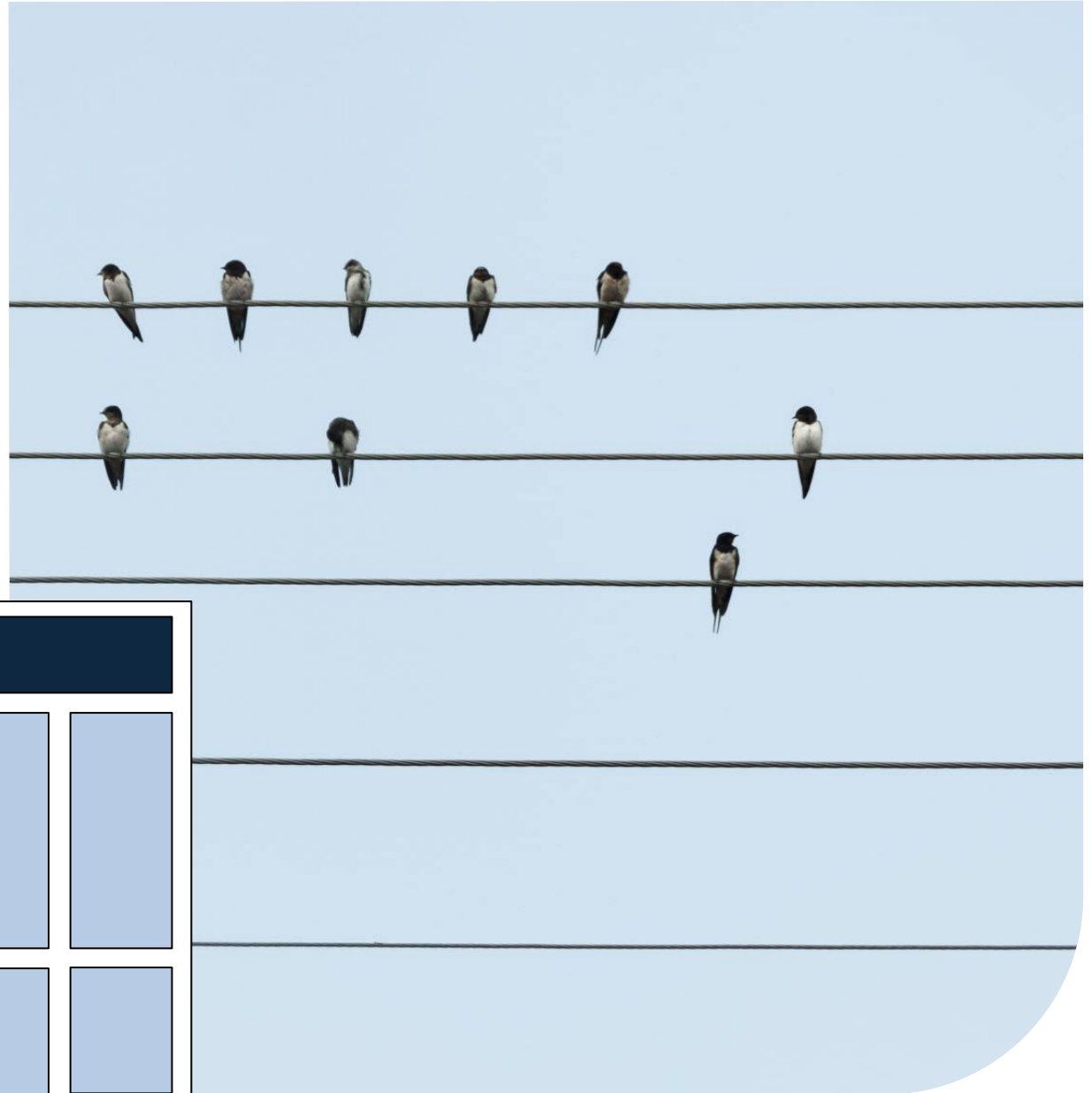


cmir794@aucklanduni.ac.nz



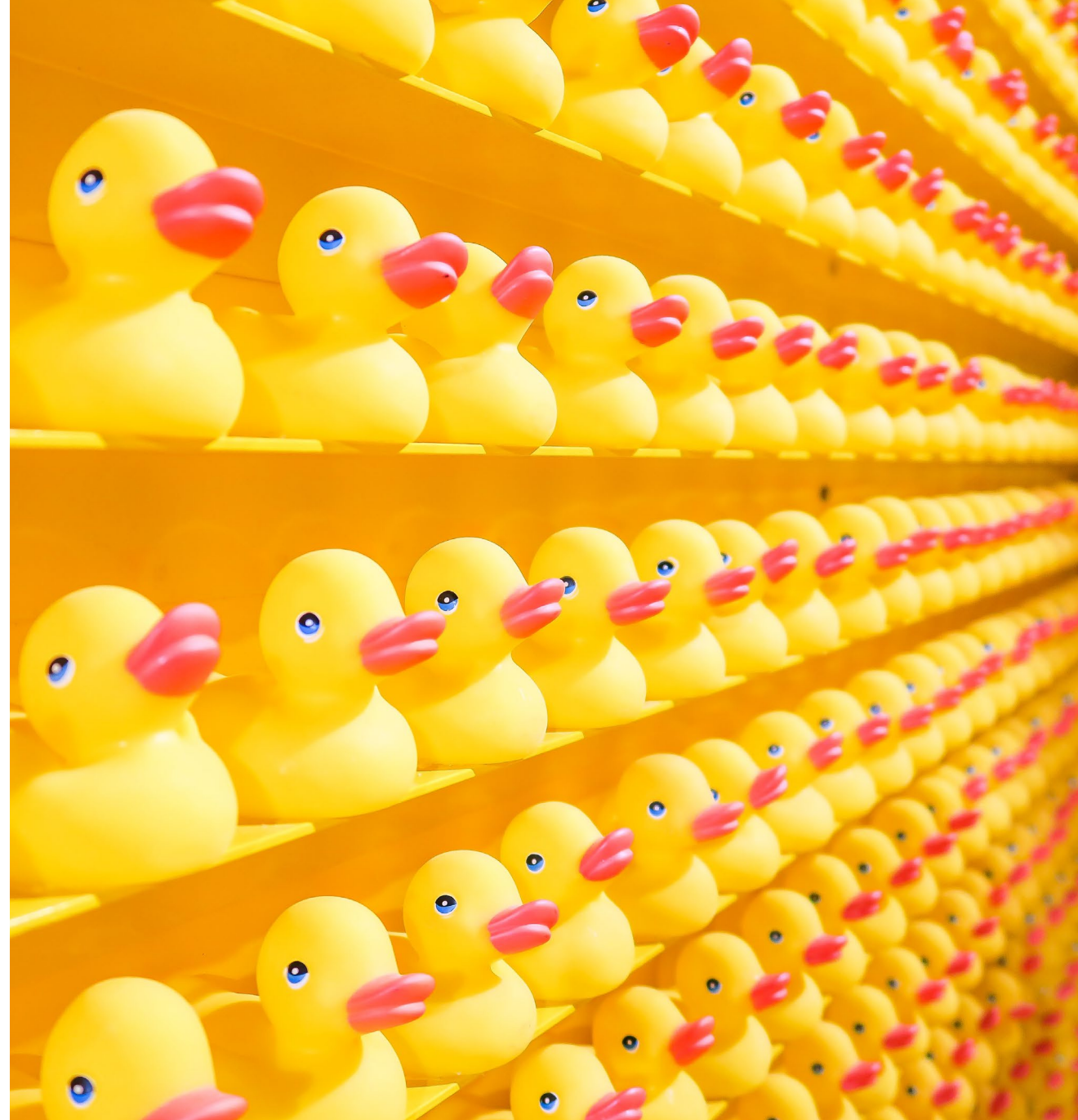
Alignment

Every element should have some **visual connection** with another element.



Repetition

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



Contrast

Event!

Campus book sale on 8th May 2025 starting at 10am and running until 2pm.

Textbooks, fiction books, biographies, Atlases and LOTS more!!

Lots of books for sale come and fill a bag for twenty dollars or individual books are sold from five dollars each. Come early to get the best deals at the General Library on City Campus.

See our website for more details:
www.auckland.ac.nz/events

CAMPUS BOOK SALE

WHEN
8 May 2025
10am - 2pm

WHERE
General Library
City Campus
5 Alfred Street, Auckland Central, Auckland 1010

BOOKS FROM \$5
FILL A BAG FOR \$20

WWW.AUCKLAND.AC.NZ/EVENTS



TEXTBOOKS



BIOGRAPHIES



FICTON BOOKS



ATLASES



Contrast

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

PREDICTING THE MILKYWHEY

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

WHY?

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**¹

AIM

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

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 analysis²

The **mathematical models** can then be used to **PREDICT** the composition from new samples **using the MIR spectra**, skipping the traditional analysis

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: 925-1,592, 1,727-1,793, 2,625-2,999 cm⁻¹

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

APPLICATIONS & IMPACT

These type of models can be used to **improve aspects of the dairy industry**, such as the detection of use of feed supplements³ and presence of adulterants⁴ 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**

REFERENCES

- FAO (2018) *World Agricultural Outlook 2018-2027*
- Sumita, A. T. (2018) *MIR spectroscopy and quality management: Why? Because*
- De Haen et al. (2019) *J. Dairy Sci.* 92(3), 238-245
- Chen et al. (2016) *J. Dairy Sci.* 99(4), 280-282
- Wang et al. (2015) *Chemical and Food Res. Food Sci.* 3(2), 178-202
- Journal of Dairy Science, Vol. 92, No. 12, 2019

Waipapa Taumata Rau University of Auckland | Te Pūnaha Matatini | Te Wai Ao DODD-WALLS Centre | MacDiarmid Institute

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.

Females	n=11	n=11
Males	n=11	n=11
Total	n=22	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.

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.

Acknowledgements

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.

Females	n=11	n=11
Males	n=11	n=11
Total	n=22	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.

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?

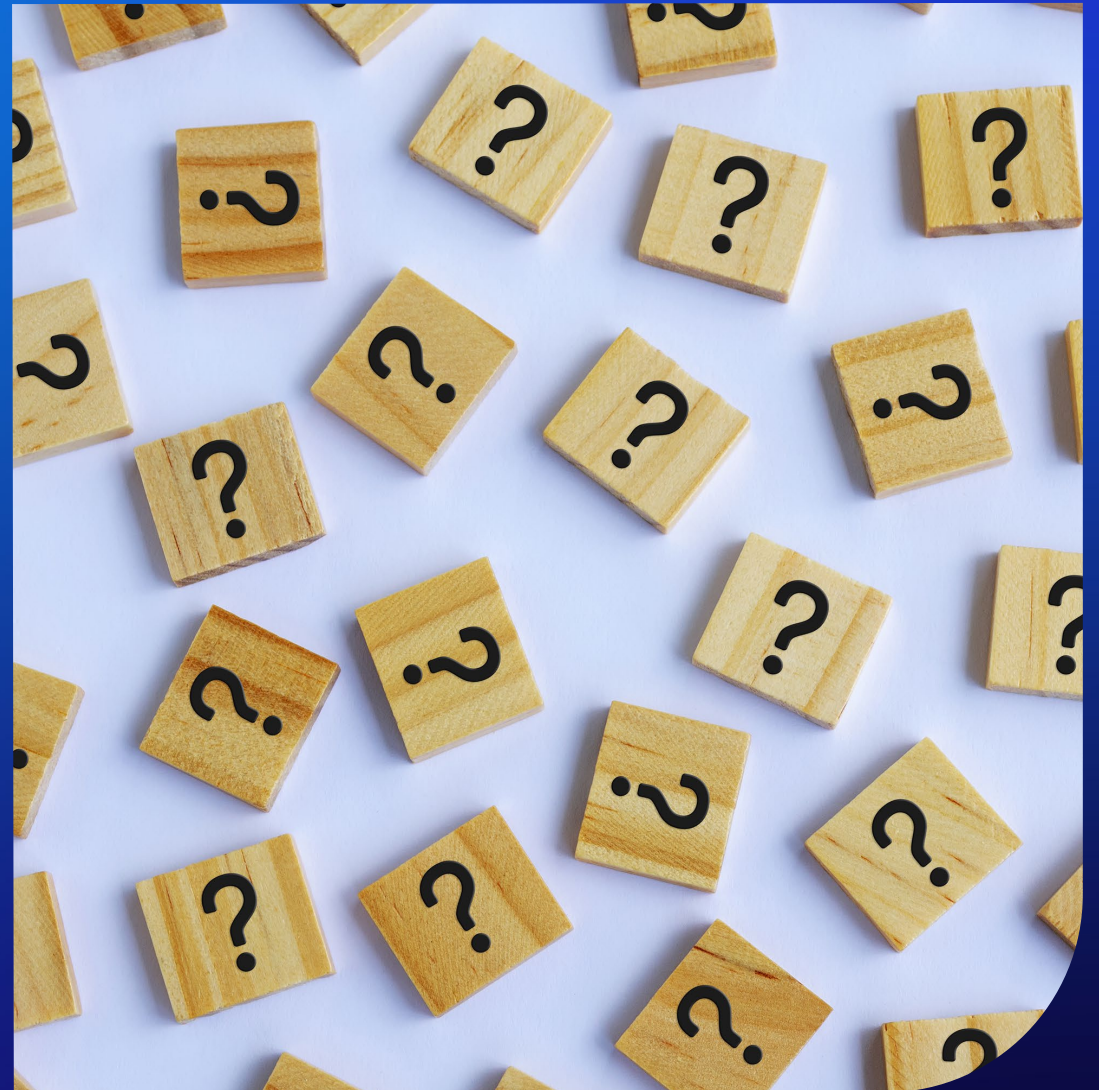
Conclusions

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.

Acknowledgements

Questions so far?



Text

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 Anguetin, 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 bullfights. 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 Théophile 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 travelling circus brought 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 saw 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 Paris 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. 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.

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 Anguetin, 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.

500
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 Anguetin, Georges de Feure and Henri-Gabriel Ibels.^[3]

300
words

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 Duntch¹ - Annabel Whibley¹ - Sarah Bailey¹ - Patricia Brekke² - John G. Ewen² - Anne W. Senterre¹
¹School of Biological Sciences, University of Auckland, Auckland, New Zealand
²Institute of Zoology, Zoological Society of London, Regents Park, London, United Kingdom

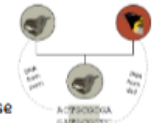
INTRODUCTION

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.



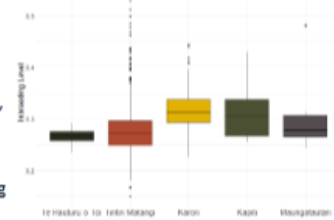
METHODS

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.



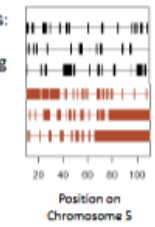
RESULT 1

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 ('Alalā).



Replace text with:

- Pictures
- Maps

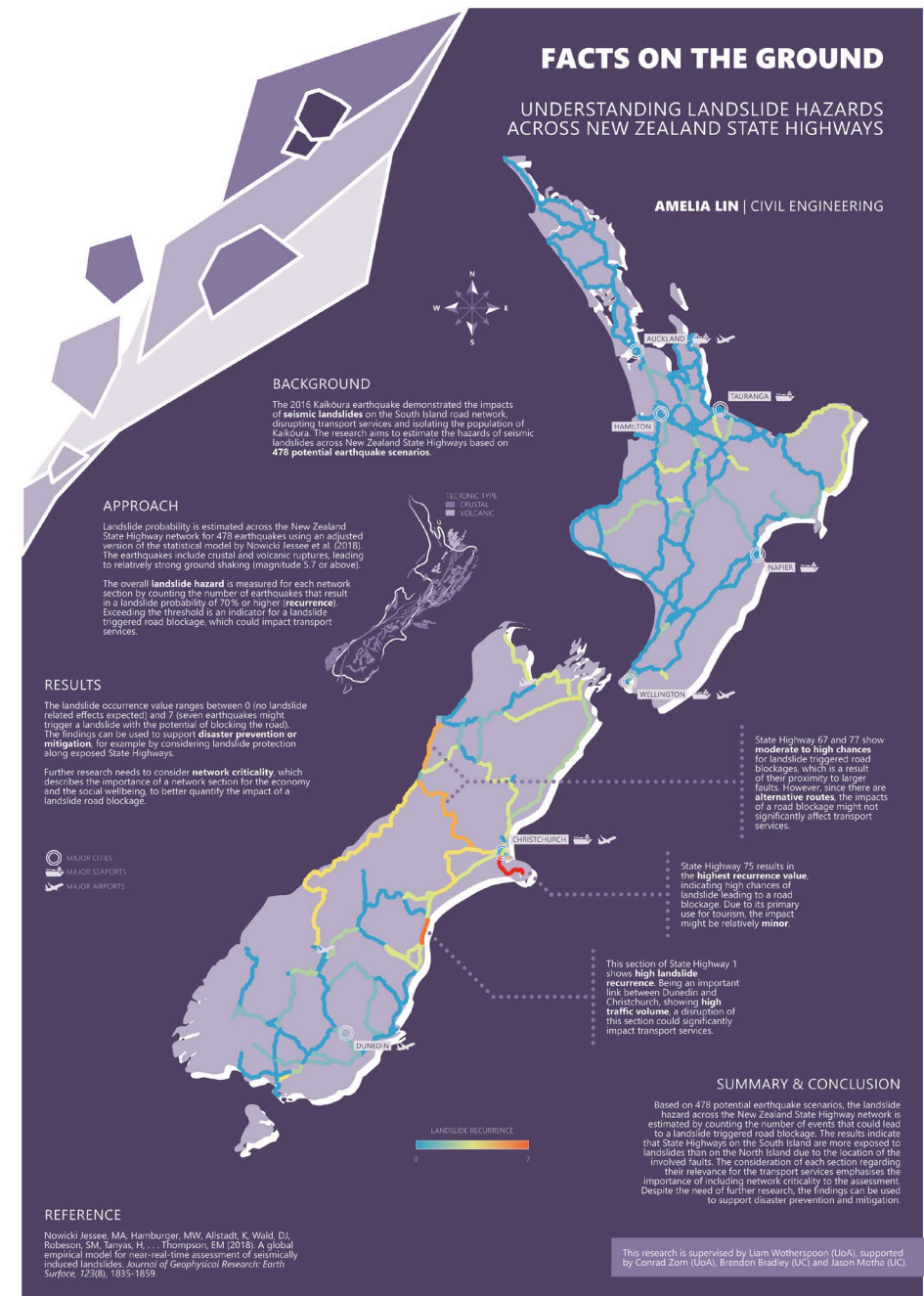




Image resolution



Where can I find images?

- [Unsplash](#)
- [Pixabay](#)
- [Pexels](#)
- [Britannica ImageQuest](#) (access with institution login)
- [Noun Project](#) (for icons)



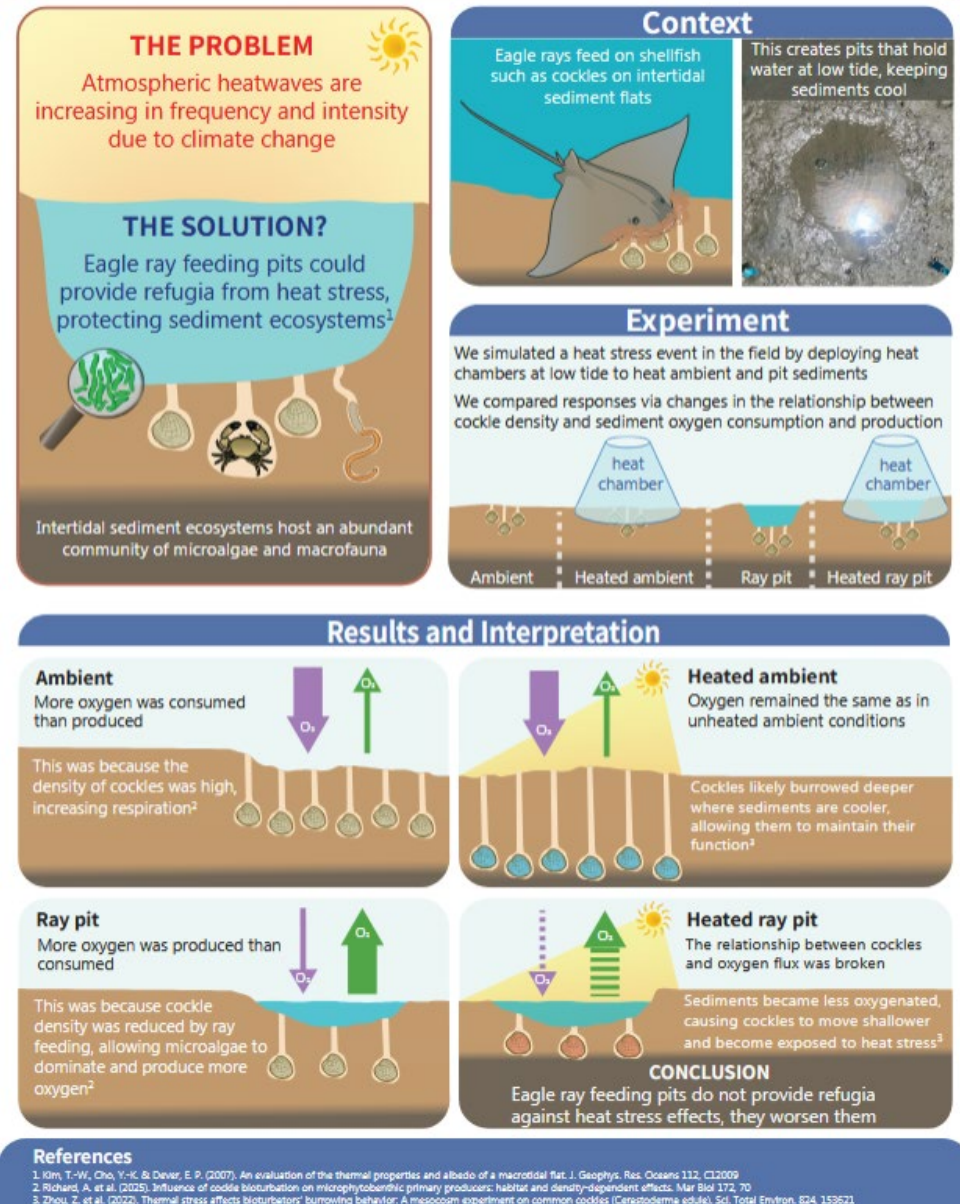
Photo by [Soragrit Wongsa](#) on [Unsplash](#)

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



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 threat¹

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 **Waiākeke 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^{3,4}

70% of all petrel species are impacted by introduced mammals⁵

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



Then, I identified the **number of traps** required to **reduce rats** below the **suppression target**.

More traps needed here!

18 stoats, 100 rats

40 traps

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.

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

Adapt Dispersal

Only **2.5%** (3/4) of birds banded were seen again

Adapt Philopatry

Only **7** adults have been seen within **25 km** from their first sighting

Adapt Dispersal

More significant is that **14** chicks have been reported **25 km** from their natal colony

Adapt Philopatry

Adapt Dispersal

Both **genetic** and **banding** data indicate that **long-distance dispersal** is occurring and restoration practices can be implemented across the geographic range without risk of creating 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**^{6,7}

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?

helps population natural more birds ecosystem biodiversity native balance

rats stoats dogs cats 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

More signage!

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

Caution!

More signage!

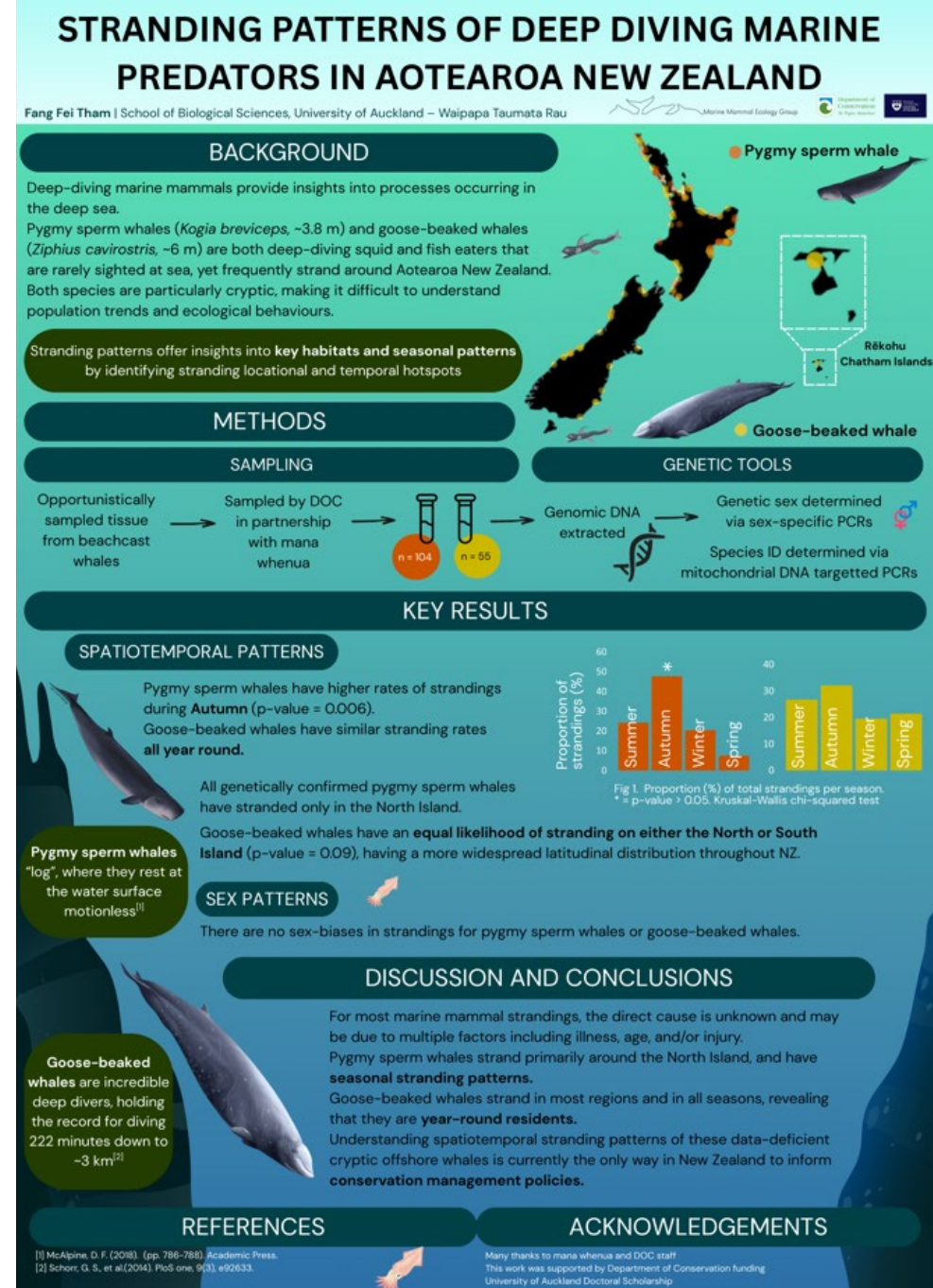
References:

1. Pollock et al. 2015. Front. Mar. Sci.
2. Paine, D. & Conner, J. 2002. Trends Ecol. Evol.
3. Jones et al. 2016. Curr. Biol.
4. Walker et al. 2016. Curr. Biol.
5. Makiy et al. 2015. Trends Ecol. Evol.
6. Paine et al. 2012. PLoS.
7. Deane et al. 2022. Trends Ecol. Evol.

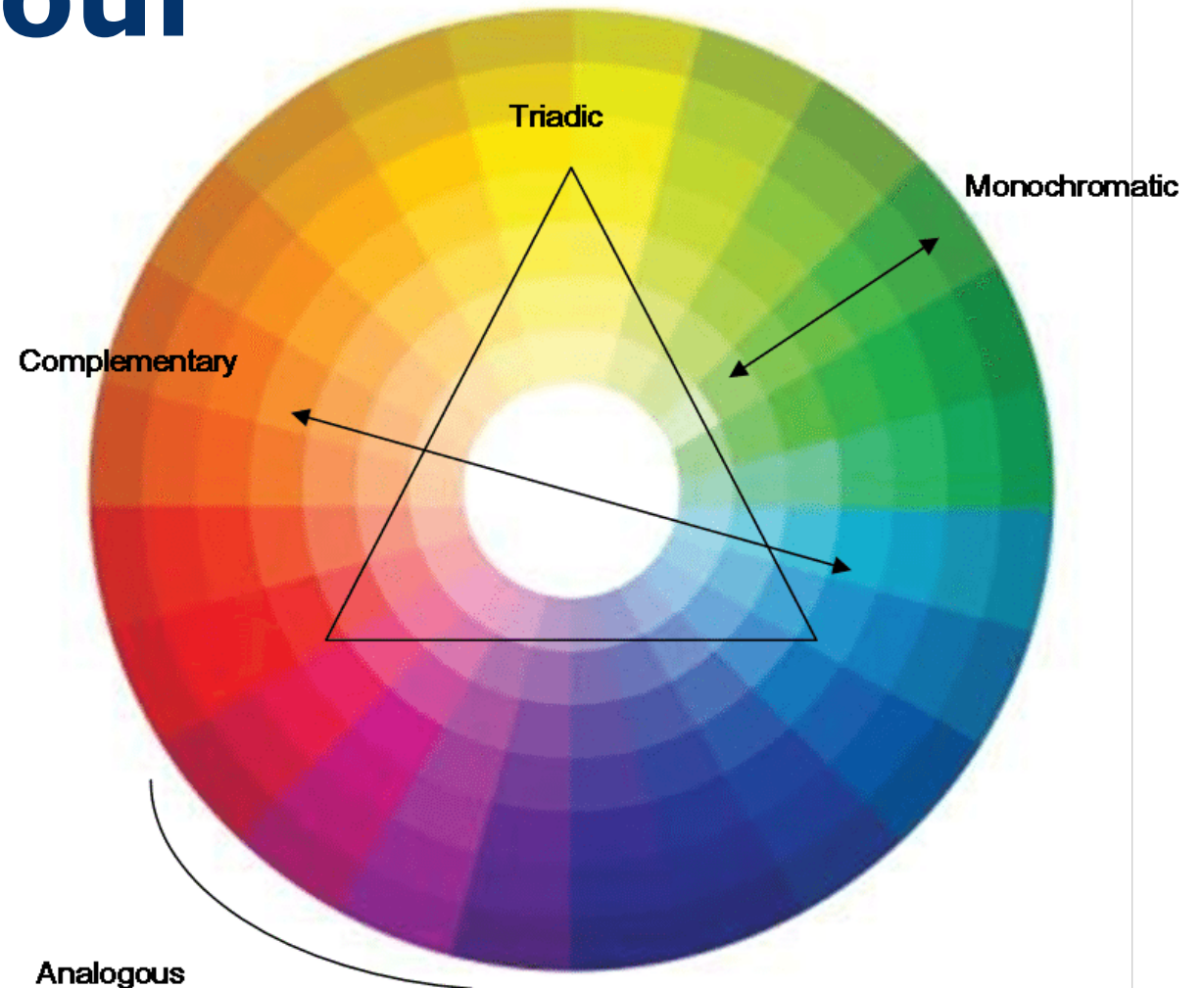
Contact: michael.fox@auckland.ac.nz

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



Colour

If you need ideas, you can explore existing colour palettes:

- [Adobe](#)
- [Canva](#)
- [Pinterest](#)
- [Coolers](#)
- [Resene](#)

Russet Apples: Look Beyond Looks Transcriptional Regulation of Triterpenes In Russet Apple Skin



Pravya Garimella
School of Biological Sciences
Supervised by: Dr Karine David, Christelle Andre

RUSSETING – Beauty Is On The Outside

- **New Zealand** Apple Fruit Industry - \$829 million²⁰¹¹ – exports predominantly red & waxy cultivars like 'Royal Gala'
- Russetting – rough brownish repair patches on skin
- Not visually appealing – lower commercial value despite a nutty flavor
- Contains potent immunomodulatory compounds - **TRITERPENES**

Smooth Skin



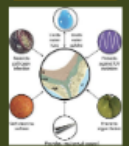
Russet Skin



What Causes Russetting?

- **SKIN** – protective barrier²⁰
- Environmental and genetic factors – skin develops **microcracks**
- Triterpenes – Secondary metabolites in the apple skin — **machinery** controlling their production poorly understood
- Triterpene **composition** affected

Skin Functions



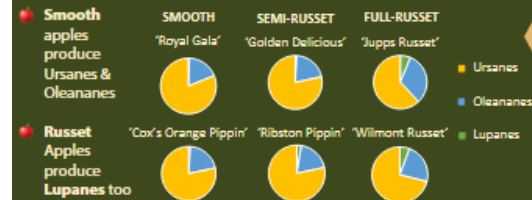
Research Question

- What **controls** the production of triterpenes in the apple skin?
- Preliminary data identified **KEY GENES** expressed in russet skin- *MdMYB52*, *MdMYM66*, *MdMYB67*, *MdMYB93*, *MdNAC038-like*

Objectives

- Check **gene expression levels** across apples exhibiting different levels of russetting
- Analyse the varying triterpene **composition** of the skin
- **Functional Analysis** – Are one or more genes upregulating the production of specific triterpenes?

Triterpene Composition



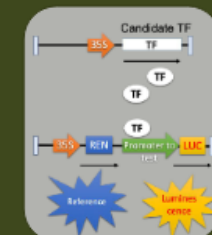
Materials

- 11 apple varieties – 3 groups based on skin type
- Smooth, Semi-Russet, Fully-Russet



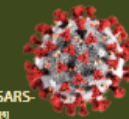
Functional Analysis

- Transcription Factors (TFs) – control expression of other genes by activating their promoters



Why Become a Russet APPLE-OGIST?

- Develop improved apple varieties with higher triterpene content
- Triterpenes produced in russet apples – anti-inflammatory, anti-cancer, anti-malarial and anti-viral properties
- **CORONAVIRUS**
 - Lupanes – competitive inhibitor of SARS-Cov2-3CL protease²¹
 - Ursanes and Oleananes – Potential as inhibitors of SARS-CoV2 replication according to computer modelling²²



References

1. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
2. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
3. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
4. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
5. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
6. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
7. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
8. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
9. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.
10. Adams, B. (2018) *Apple*. In: *Encyclopedia of Food Safety*. Food and Agriculture Organization of the United Nations, Rome, Italy. 1-10.



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
Some colour combinations	make text difficult to read
Some colour combinations	make text difficult to read
Some colour combinations	make text difficult to read
Some colour combinations	make text difficult to read



Colour

Pick colour combinations that make text EASY to read

Pick colour combinations that make text EASY to read

Pick colour combinations that make text EASY to read

Pick colour combinations that make text EASY to read

Pick colour combinations that make text EASY to read

Pick colour combinations that make text EASY to read

Pick colour combinations that make text EASY to read

Font

96 Font } Title

48 Font }
36 Font } Headings

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

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



Font

Use professional **FONTS** that

⇒ people *can* read **EASILY**

Use **professional fonts** that
people can **read easily**

Questions?

Contact us: library.auckland.ac.nz/ask-us

Ngā mihi!

Thanks! 😊