AI Hackathon

AI for the Environment Hackathon Festival

Essential Information Sheet

What is a Hackathon?

From protecting water resources, fighting climate change, reducing pollution, managing land use, preserving biodiversity and improving the ways we experience our own environments, we're using AI to help make a difference.

Hackathons are a design and coding sprint where technical and non-technical hackers (participants) work together to solve problems and build exciting projects. You'll learn new skills, create connections, make an impact and network with mentors.

Each of our Hackathons runs for 48 hours between 8-11 August, nationwide..

Each team will pitch their idea to a judging panel and location winners will be announced. Our judging panel will select finalists to pitch their idea at the 2024 Aotearoa AI Summit. The national winner will be announced at the 2024 Aotearoa AI Summit, 11 September in Auckland.

Outcomes:

- Learn new skills
- Create connections and form new friendships
- Make an impact and help make a difference
- Network with mentors
- Get noticed - this may be your career making event

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How can I participate?

Choose to participate as a hacker or mentor:

But first, join the conversation!
We're using Badger to create connections, form teams, collaborate together before and during the Hackathon.
Scan the QR code now.

Participants:
Participants form teams for the hackathon to create solutions to the problems.

Mentors:
We are seeking a variety of people with different skills who can support participants from a technical perspective and subject matter expertise (e.g. technological or environmental) through to problem solving and pitching concepts.

IDEAS
Consider your idea before the event and get help from us, or you can come to the event and form a spontaneous team around a new idea.

You can register your idea before the event on the Hackathon Badger page (QR code above). The earlier you register your idea (problem to solve), the more likely it is that we will be able to source relevant datasets – setting you up for success.

Those with new ideas on the day can seek help from mentors and access the datasets we have sourced.

If you have an idea and would like assistance with dataset, please contact us by email: info@aiforum.org.nz

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How do I form a team?

You can:

- Come as a pre-formed team
- Register as an individual and join a team
- We recommend that teams have 3 to 6 members

Hackathons are a safe space for people from diverse skill sets to come together around a problem to solve. When forming your team, a good mix of people and skill sets will help you to be successful.

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How do I join?

1.   **REGISTER** as a participant, mentor or experienced online hacker here

2.   **SELECT** your venue

3.   **CHOOSE** your ticket:
     a.   Students tickets are $15.00
     b.   General tickets are $25.00
     c.   Online tickets are $15.00
     d.   Mentor tickets are free

4.   **HUSTLE** to get your free Hackathon 2024 T-shirt

5.   **Use this Badger QR code** to ask questions, pitch your ideas to others and form teams ahead of the event

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What key dates do I need to know?

Information Sheets live on website   25 June 2024
Briefing for participants, mentors and hosts

Live Q&A Session 1   9 July, 2024 | 12noon - 1pm
Jump online to ask all your questions
Register using the zoom link above

Live Q&A Session 2   23 July, 2024 | 12noon - 1pm
Jump online to ask all your questions.
Register using the zoom link above

Hackathons Nationwide   8-11 August 2024
Regional finalist and winners | In person | Online

National Judging Day   15 August 2024
International panel of Judges | Online

AI Summit 2023   11 September 2024
Aotea Centre, Auckland | In person

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Where is everything I need to know?

Our dedicated [Hackathon 2024 website](#) has all the latest Hackathon information and resources.
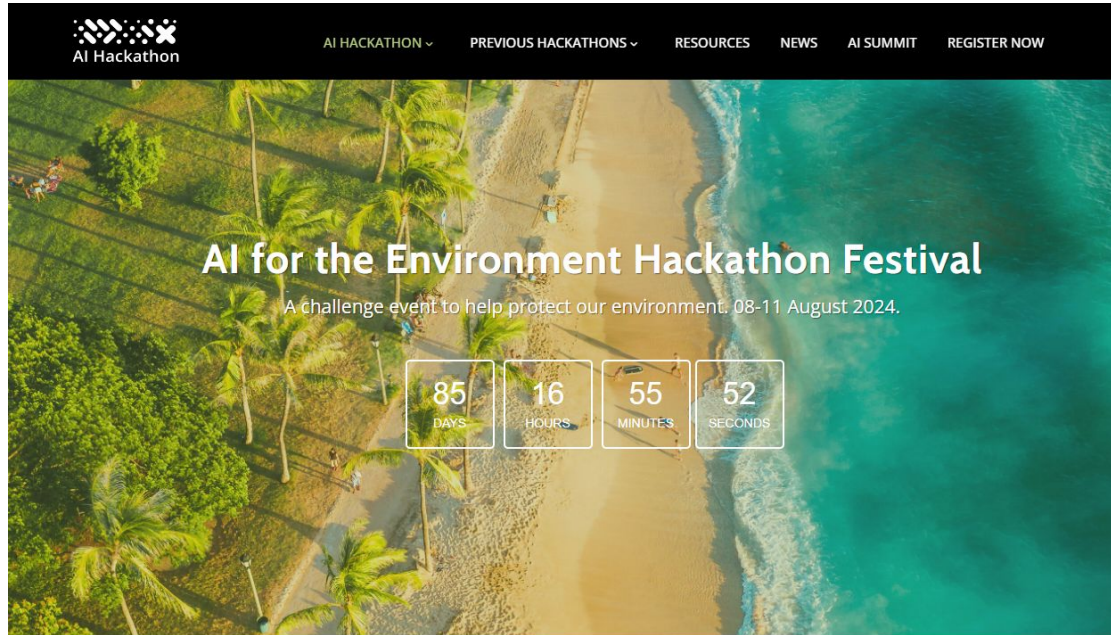
What locations do I need to know?

Our dedicated [Hackathon 2024 website](#) has all the latest Hackathon information and resources.

Auckland | 8-9 August
Datacom, 58 Gaunt Street, Auckland CBD.

Auckland | 9-10 August
academyEX, Manuka Room, 99 Khyber Pass Road, Grafton, Auckland.

Christchurch | 8-9 August
University of Canterbury, Christchurch.

Otago | 10-11 August
Otago Business School, 60 Clyde Street, Dunedin.

Waikato | 8-9 August
AI Institute, School of Computing & Mathematical Sciences, University of Waikato, Gate 8, Hillcrest Road, Hamilton.

Wellington | 8-9 August
AWS Wellington, Level 21, 157 Lambton Quay, Wellington Central.

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Where do I go for more information?

Keep an eye on your [socials](#) for updated information

One week before your Hackathon you will receive a participant or mentor pack

PROBLEMS TO SOLVE

From protecting water resources, fighting climate change, reducing pollution, managing land use, preserving biodiversity and improving the ways we experience our own environments, we're using AI to help make a difference.

This year we are expanding our problems to solve beyond the five key environmental outcomes (AI for the Environment Report 2022) to include kaitiakitanga, embracing our connection to the land and surrounding natural environment fulfilling our roles as custodians.

Participants are welcome to bring their own problems to solve. If you do, we recommend letting us know so that we can do our best to help with data sets and technology support.

However, in case you are looking for ideas, we have found these ones for you – and some of the organisations involved will provide subject matter experts to help on the day.

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PROBLEMS TO SOLVE

Climate Change Mitigation
Reduction of greenhouse emissions, mitigating the effects of climate change including planning and recovery from natural disasters

Protecting our Freshwater and Marine Resources
How we fish, the taking of water from waterways, and what we discharge into waterways

Reducing Pollution from our Activities
Substances or kinds of energy (noise, light, heat) that are harmful to the environment

kaitiakitanga
embracing our connection to the land and surrounding natural environment fulfilling our roles as custodians.

Preserving and Bolstering Biodiversity
Protection of native plants, animals, ecosystems on land, freshwater and marine environments

Impacts of Changing Land Use
Changes to vegetation and land uses and the impact that has on the Environment, e.g. Biodiversity, Erosion and Climate Change, and use of land as an effective resource (e.g. Farming)

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People are part of the environment, not apart from it

kaitiakitanga, embracing our connection to the land and surrounding natural environment fulfilling our roles as custodians.

- Noise pollution has been shown to have negative impact on invertebrates and sea creatures, but we also know that it raises stress levels in humans

- we are amazing producers of food yet we fail to feed our own people adequately and nutritiously

- When the wind picks up my plastic bag or I accidentally drop my single use water bottle, I may not see the impact - but the world does...

- Overfishing in the Hauraki Gulf has led to barren underwater desert. With the ecosystem's imbalance we are seeing more jellyfish (baby jellyfish are sea lice) and algal blooms - both of which negatively impact human enjoyment of the Gulf

- Auckland City is surrounded by beautiful beaches, yet if you are living in South Auckland you could be forgiven for thinking you live 100 miles inland - beaches are not accessible, there is no easy public transport from Otara to the east or west coast beaches many of us take for granted - they may be free, but for some people there are barriers that make it almost impossible to getting there.

- Saving 1 or 2% of the national grid would be a game changer for NZ reaching its climate change goals. People use electricity.

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Protecting our Freshwater and Marine Resources

- How we fish, the taking of water from waterways, and what we discharge into waterways

- How we monitor the impact of Marine Activities like energy exploration and mining

- How we fish and farm: measure and count fish on vessels, monitor farm emissions

- Tools and monitoring to improve fishing practices around protected species like whitebait, monitoring catch fish sizes, bycatch mitigation, protection of seabirds and sea lions and other protected species.

- Discharge of waste: monitor sediment and contaminant levels in water discharge

- What are the observable impacts of climate change on our coastal marine environments, and what scenarios might work best to address these. Examples include species specific monitoring and actions, like the Maui63 Project; the impact of marine reserves and no-take zones; kina barrens and harvesting kina to control populations; the occurrence of previously rare fish diseases (e.g. Zombie Snapper), establishment of invasive species like Caulerpa, understanding more about the seafloor and benthic environments.

- Speciation: There is a lot of work looking at this now - how could AI help? E.g. biggest issues are accessible reference images in tagged databases - this is time consuming work and tends to be stored in siloed data sets.

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Protecting our Freshwater and Marine Resources

NZ has the highest rates of marine mammal stranding events in the world – could AI help us to understand why this is and how we might be able to help whales to help themselves. For example, bringing together data from sources to uncover hidden truths, such as:

- Analysis of cause of death and underlying problems via a sonogram and other non-invasive, culturally sensitive diagnostics

- Non-human environmental factors including weather, wave action, coastal features, warming oceans

- Human environmental impact including environmental damage from fishing, mining, run-off from forestry and farms, oil spills.

- Noise pollution, especially from human activities
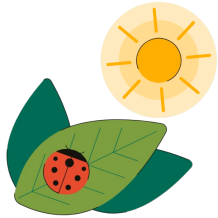
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Preserving and Bolstering Biodiversity

Protection of native plants, animals, ecosystems on land, freshwater and marine environments

Outcomes | Proving and Celebrating the impact of community work is often as important as the work itself

Cacophony + | Cacophony is an opensource project https://cacophony.org.nz/ Its aims include measuring the outcomes of pest eradication efforts in birdsong. How can we use AI to supercharge programmes like this?

In 2022 teams produced (Rat)FRT solutions. A new challenge might be to develop a toolset that alerts predator free teams when a new predator arrives in a previously cleared area.

Maramataka | There is a belief amongst some predator free groups, supported by their own observations, that trapping during certain phases of Maramataka, the Maori lunar cycle, is far more effective that at other times. Focusing the limited resources available to trapping and pest eradication programmes on optimum results is essential to the effective eradication of pest species. In previous hackathons we have learnt valuable information such as study results that indicate up to 50% of traps capture over 90% of the target animals currently trapped, depending on where the traps are placed. Being able to target the most effective times for trapping could focus efforts even more effectively.

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Impacts of Changing Land Use

Changes to vegetation and land uses and the impact that has on the Environment, e.g. Biodiversity, Erosion and Climate Change, and use of land as an effective resource (e.g. Farming)

Climate Change | monitor carbon sequestration in woody vegetation or blue carbon

Forestry | carbon accounting and riparian planting monitoring

Erosion | measure landslip faces in imagery or sediment sources in cities

Re-Food | Emily King's book 'Re-Food' challenges us to find new ways to address our failure to successfully feed our population and to make sure the food we feed people is nourishing. Think about the impacts of data gaps for food wastage; new farming techniques; new foods

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Reducing Pollution from our Activities

Substances or kinds of energy (noise, light, heat) that are harmful to the environment

Monitor noise pollution in cities, near airports

Identify illegal dumping of waste on land, in our waterways and at sea

Monitor air quality near industrial areas and in high density areas

Building new amenities like playgrounds in the areas where they are likely to make the biggest impact socially and least negative impact environmentally

Noise pollution has an observable impact on our mental health and wellbeing - it even impacts the stress levels in butterflies and other invertebrates. Effective monitoring of noise pollution in cities, near airports, busy roads, and in our marine environment and correlating this to other data sources could help us bring this hidden issue to life for people everywhere.

We measure the impact of runoff from farms and the farming community are doing their bit to change their practices, addressing their impact through activities like runoff capture, tree planting and restoration of wetland environments - but what about the impact of illegal dumping of waste on land, in our waterways and at sea? How do we monitor, police these activities more effectively - and restore our precious ecosystems?

Are there better practices to prevent another disaster like Rena? At 0214 on 5 October 2011, the Rena ran aground at full speed on Astrolabe Reef. The ship remained stuck fast on the reef and in the ensuing months it broke in two. The aft section moved off the reef and sank. About 200 tonnes of heavy fuel oil were lost to the sea. A substantial amount of cargo in the containers was lost. [MV Rena | Report]

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Climate Change Mitigation

Reduction of greenhouse emissions, mitigating the effects of climate change including planning and recovery from natural disasters

Monitoring ecosystem change in context of climate change and extreme events

Predicting GHG emissions based on sector activity data

Emergency Recovery | The frequency and violence of events is increasing Impact on environment, for example: land, waterways, biodiversity. How do we:

- Improve our preparedness and warning systems?
- Improve our ability to respond during crisis?
- Improve our ability to help our flora and fauna regenerate?

In 2023 Cyclone Gabrielle devastated large parts of New Zealand, causing loss of life and significant environmental degradation. AI has an important role to play in helping us prepare and respond: In Auckland, AI is transforming the way that flood risks are uncovered and warnings are generated in real time: [Learn more]
The devastating floods and landslips in the Gisborne and Hawkes Bay regions highlighted the urgent need for proactive measures to protect our land and communities. Teams built an interpretable model produced a probability map of landslips. The model revealed a strong correspondence between the predicted slips and actual slips as well as a clear relationship with slope and vegetative cover - meaning there are practical steps we can take to reduce the likelihood of slips in the future simply by changing the things we plant on high risk land.
[Case Study]

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CRITERIA

Your pitches will be judged against the following criteria:

Meeting the innovation brief:
1. You must be solving an environmental problem that is aligned to the 5 key areas outline in this brief
2. Your pitch must involve a technology innovation – this includes innovative use of existing technology.
3. The technology used must include elements of AI. You must explain what these are and how they are used.
4. If you have completed any work prior to the event, you must disclose what work was and your starting point.

Problem and Solution:
1. Demonstrate that you understand the problem you are solving
2. Explain how your solution solves it
3. Be clear and concise

Will your solution work?
1. Is it technically feasible?
2. Will it solve the problem?

Our judging panel are very experienced practitioners from business and academia. Their decisions are final.

We will provide mentors at the event who can help you prepare your pitches.

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Rules of Engagement

We are inclusive organisations, we welcome people from all genders, ethnicities and backgrounds. We ask that you:

- **Be welcoming** to each other and treat everyone with respect
- **Be open** to learning new things and form new friendships
- **Be fair**. You can pre-plan with your team, but keep to the spirit of the event by collaborating and developing your ideas at the event itself
- **Be respectful**. Our hosts are welcoming you into their environments, please follow their guidance and rules

Intellectual Property
Neither the AI Forum nor any of the sponsors have any interest in IP created at the event – whatever you create is your own.

Please be mindful of what others have created – legally you must comply with the terms and conditions of any IP ownership rights that exist regarding the things that you use. Any rights infringements are at the participants' own risk.

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Pitch deck template

View / Download our pitch deck here >> PPT | PDF

CONNECT *Connect with your audience*

30 seconds

Think of it like speed dating – you have 30 seconds to make your first impression – and that first impression could change your life (and everyone else's) FOREVER

- Who are you and what is your passion?

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PROBLEM TO SOLVE

1 minute

What is the problem you are trying to solve? and Why should I care?

- Who or what does it impact?
- Humanise it – Create empathy for the creatures (human or otherwise) impacted
- Use a short story and KILLER DATA (this is an AI Hack after all)

Make sure you describe the problem you are solving (not necessarily the one that you set out to solve)

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YOUR BIG IDEA

2 minutes

Explain your innovation

- How does it solve the problem?
- AND how does your innovation meet the brief?
- Show us your prototype (High Fidelity or Click-through slideware)

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FUTURE IMPACT

1.5 minutes

IMPACT

- What will your innovation change?
- Be compelling - Why should I care?

WHAT DO YOU NEED?

- What do you need to make this work?

FUTURE

- What could this mean for the future? (FOR OUR FUTURE?)

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TECHNOLOGY

BYOD
Bring Your Own Device – the hosts are providing connectivity but not hardware.

TAIAO
The TAIAO Project has free software available

AWS
AWS are providing online technology training and technical support

Google
Google are providing online technology training and technical support

Microsoft
You can register for temporary licences as an individual (you can do this at any time)

Meta
Meta has a range of open source tools available.

Other
You are not limited to these options – you are welcome to BYO software as well.

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TAIAO Project Partners are:
- University of Waikato
- University of Canterbury
- University of Auckland
- Met Service
- BECA

TAIAO [taiao.ai] is a community website designed to bring environmental scientists, data scientists, academics and the wider community together to share resources and collaborate.

As a user you can download and access a wide range of datasets, Jupyter Notebooks, software, and tutorials.

As a contributor, you can share your work, receive feedback, and help others with their work.

We advise you to read the registration guide and create a log in now.
This will enable you to:

Share datasets and notebooks
Access Tutorials and Software (including free licences)
Find support – FAQs and email

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AWS has an excellent set of pre-recorded online content that all participants can access free.
Once you create a log in you will be able you to:
- Search and access datasets relevant to your idea
- Access Tutorials and Software
- Find support via FAQs and email

DATA REGISTRIES:
- AWS Open Data Registry (which has the GeoNet Aotearoa dataset loaded)
- LINZ also make a lot of data available that can be used.

Once we know what areas you are interested in we can start to recommend data sets.

FREE TRAINING:
AWS recommend the following courses (registration is required but free):
- AWS Foundations (if not familiar with AWS) – 1 hour
- Developing Machine Learning Applications – 4 hours
- Take a look at AWS Machine Learning University. This is a curated grouping of ML content that Amazon uses to train its own ML developers and will support deep dives into a number of topics.

If your organisation has any specific training needs that are not covered here please get in touch. AWS is one of our hackathon partners and will do their best to have people available to help on the day.

Amazon SageMaker

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DATA SETS

Google Dataset Search: Similar to how Google Scholar works, Dataset Search lets you find datasets wherever they're hosted, whether it's a publisher's site, a digital library, or an author's web page. It's a phenomenal dataset finder, and it contains over 25 million datasets.

TECHNOLOGY
Free licences: https://cloud.google.com/free
Google allow 90 day fee free licenses, You must give a credit card to register, but are not charged unless you explicitly enable billing by upgrading your Cloud Billing account to a paid account. Licenses covered include:

- Vision
- Natural Language
- Speech to text and translations
- ML Tables
- Big Query (1TB per month)

TRAINING - https://cloud.google.com/training/machinelearning-ai

Cloud OnBoard is a free, online training where instructors lead hands-on labs and test your skills with quizzes and games.

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You can search which tools are available here:
https://azure.microsoft.com/en-gb/explore/global-infrastructure/products-by-region/?regions=all&rar=true&products=

Azure AI platform,
services, and solutions

Innovate and accelerate with powerful tools and services that bring artificial intelligence to every developer.

▷ Play AI platform video   Explore Azure AI >

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Meta

Meta has a range of open source technologies available here: https://opensource.fb.com/

Read all about it here: https://developers.facebook.com/products/?filter-id=artificial-intelligence

Artificial Intelligence

Advancing the field of machine learning to empower AI developers.

ARTIFICIAL INTELLIGENCE

AI Research

Latest ground-breaking research papers and breakthroughs.

OVERVIEW ↗

ARTIFICIAL INTELLIGENCE

AI Tools

Deep learning frameworks and tools for research and production.

OVERVIEW ↗

ARTIFICIAL INTELLIGENCE

Wit.ai

Turn what your users say into structured data your code can use.

OVERVIEW ↗

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OTHER DATA SETS

NEW ZEALAND DATA SETS
- Data.Govt.NZ
- Stats New Zealand large data sets
- National Library of New Zealand Open Data Sets

BYO DATA
Some teams may have their own data set to bring

NOT HERE?
The earlier you can share your ideas with us, the more likely it is that we will be able to help you source the right data sets.

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Callaghan Innovation
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Time-Evolving Data Science
and Artificial Intelligence for
Advanced Open Environmental Science

UC UNIVERSITY OF CANTERBURY
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UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

Te Ipu o te Mahara
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Stay up to date with the latest information: *www.aihackathon.nz*