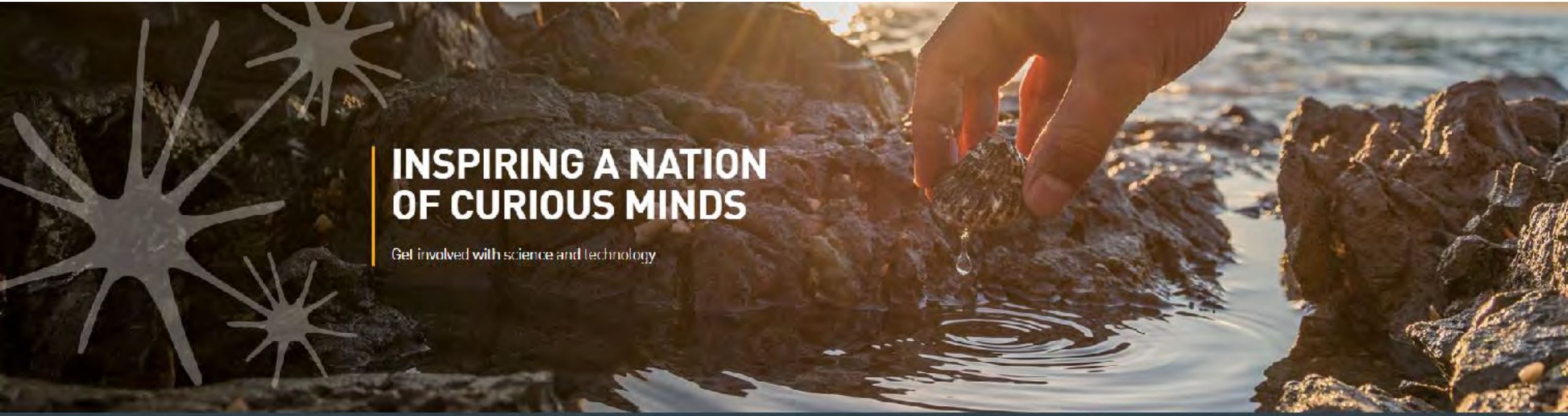
CURIOUS MINDS
HE HIHIRI I TE MAHARA

@VicMetcalf_NZ

@queenofcuriosity




# Communicating the science of low emissions

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

Office of the Prime Minister's Chief Science Advisor

New Zealand Government


Mike Keefe

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# What do you value?

What are the things that are most important to you?

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When you hear ‘climate change’ what words spring to mind?
When you hear ‘low emissions’ what words spring to mind?

# Climate change communication history

## Quoted: Newsroom

*"There's a ticking time bomb coming down the line and there is cause for concern. It's not like a terrorist attack or a plane crash, these things are slowly creeping into our future."*

*University of Canterbury's Professor Matthew Turnbull on the* **threat of climate change**.

**Climate Change Communication in New Zealand**

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Oxford Research Encyclopedia of Climate Science

**Climate Change Communication in New Zealand** FREE

Rhian Salmon, Rebecca Priestley, Michele Fontana, and Taciano L. Milfont

Subject: Climate Change Communication Online Publication Date: Aug 2017
DOI: 10.1093/acrefore/9780190228620.013.475

OPEN ACCESS
IOP PUBLISHING
ENVIRONMENTAL RESEARCH LETTERS
Environ. Res. Lett. 8 (2013) 024024 (7pp)
doi:10.1088/1748-9326/8/2/024024

# Quantifying the consensus on anthropogenic global warming in the scientific literature

John Cook[1,2,3], Dana Nuccitelli[2,4], Sarah A Green[5], Mark Richardson[6], Bärbel Winkler[2], Rob Painting[2], Robert Way[7], Peter Jacobs[8] and Andrew Skuce[2,9]

11,944 climate abstracts from 1991-2011 analysed

97.2% endorsed the consensus

4 September 2014

**99.999% certainty humans are driving global warming: new study**

**The Conversation**

A new study finds overwhelming odds that humans have contributed to higher global temperatures – so how much are we willing to gamble that it's wrong? Kraevski Vitaly/Shutterstock

# Perceptions of scientific consensus do not predict later beliefs about the reality of climate change: A test of the gateway belief model using cross-lagged panel analysis

John Richard Kerr*, Marc Stewart Wilson

*School of Psychology, Victoria University of Wellington, PO Box 600, Wellington 6140, New Zealand*

J Exp Psych 2018

. The results suggest that individuals' perceptions of a consensus among scientists do not have a strong influence on their personal beliefs about climate change.

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro


A pedagogy of interconnectedness for encountering climate change as a wicked sustainability problem

Anna Lehton

[a] University of Helsink
[b] University of Eastern
[c] University of Helsink

prevailing ways of thinking and behaving related to a modern understanding of humanity and education. In this article, the challenges of sustainability education are explored from the theoretical perspective of modern dichotomies. The article argues that to combat wicked problems of sustainability, awareness of interconnectedness is vital. In order to increase the understanding of what kind of dismantling of

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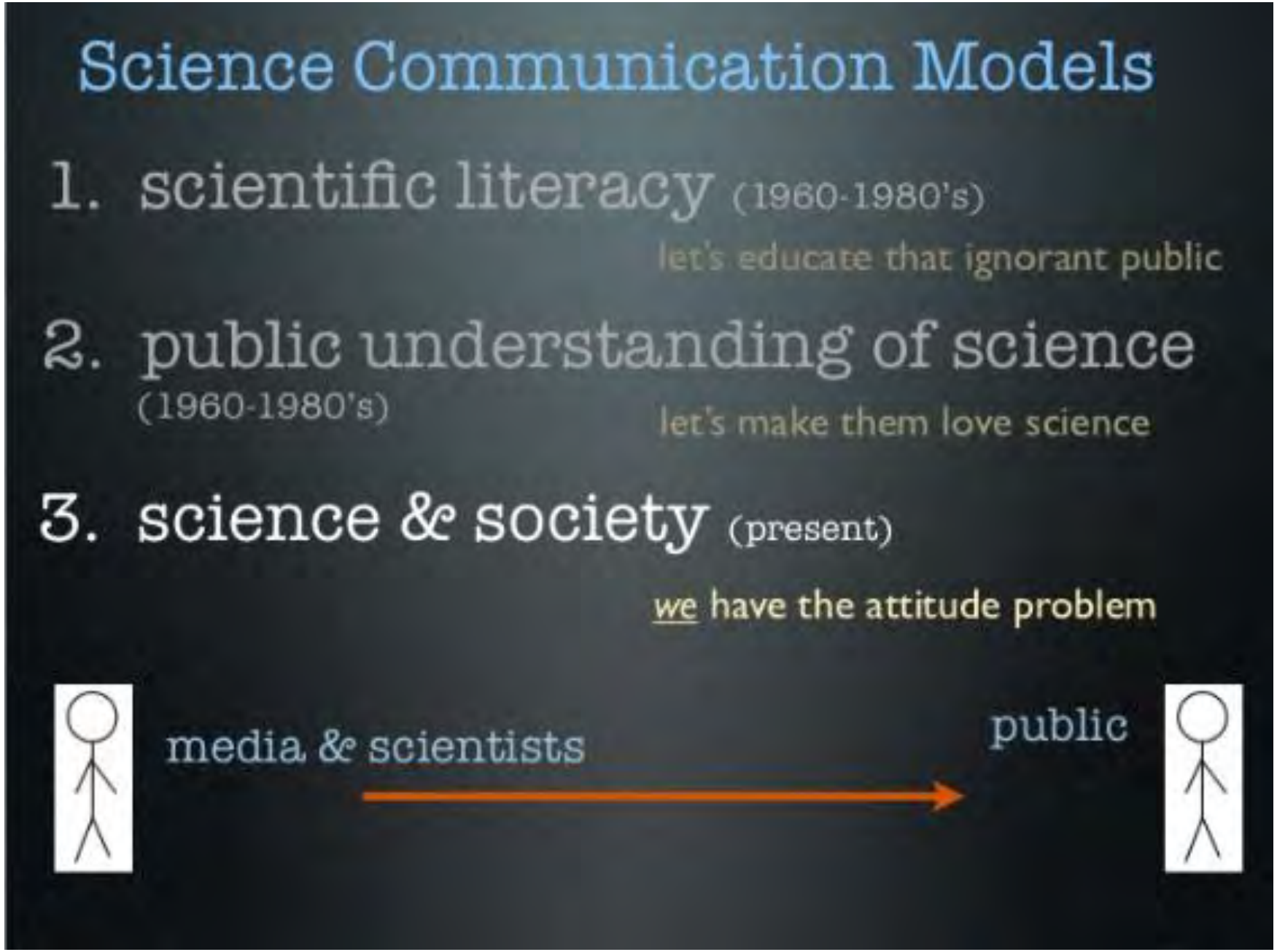
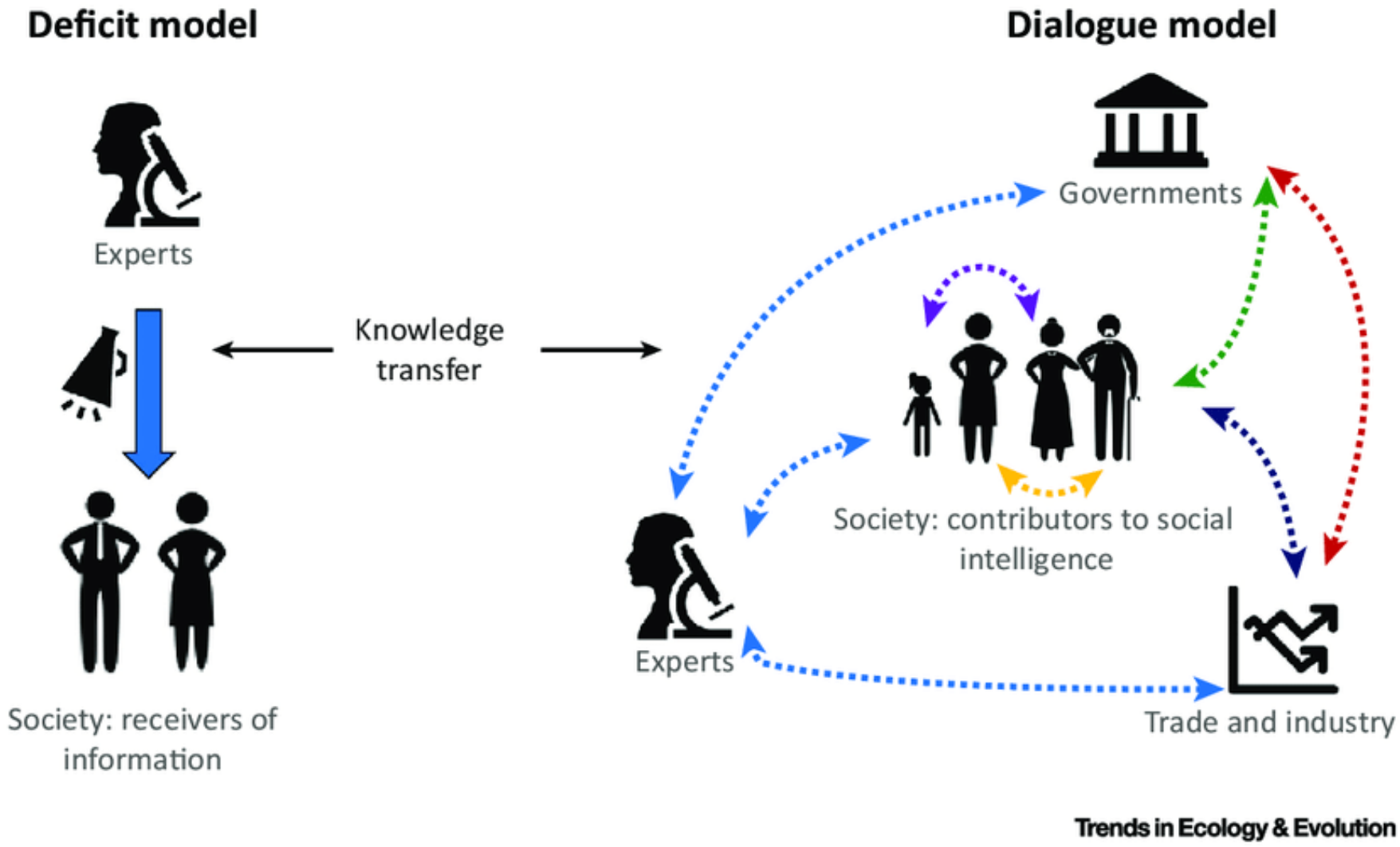
# Passivity- Waiting for Climate Change

“Politicians discussing climate change” by Spanish sculptor Isaac Cordal




https://www.slideshare.net/stephaniechasteen/speaking-of-physics-the-art-of-science-communication/10-Science_Communication_Models1_scientic_literacy




•Invasion Biology: Specific Problems and Possible Solutions

•**Article (PDF Available)** *in* Trends in Ecology & Evolution 32(1) · November 2016 *with* 1,103 ReadsDOI: 10.1016/j.tree.2016.11.001

JJ on Wikimedia

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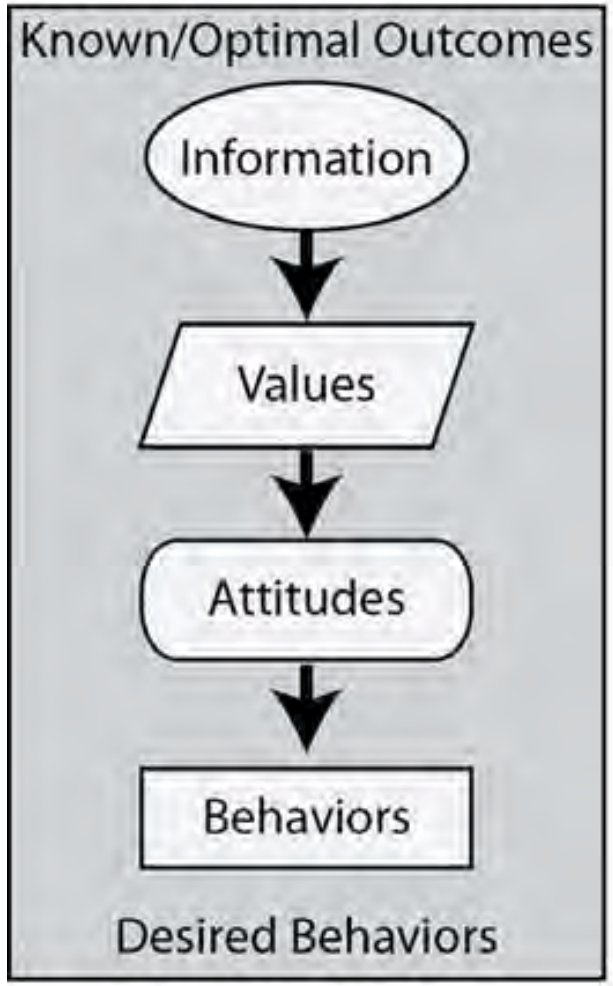
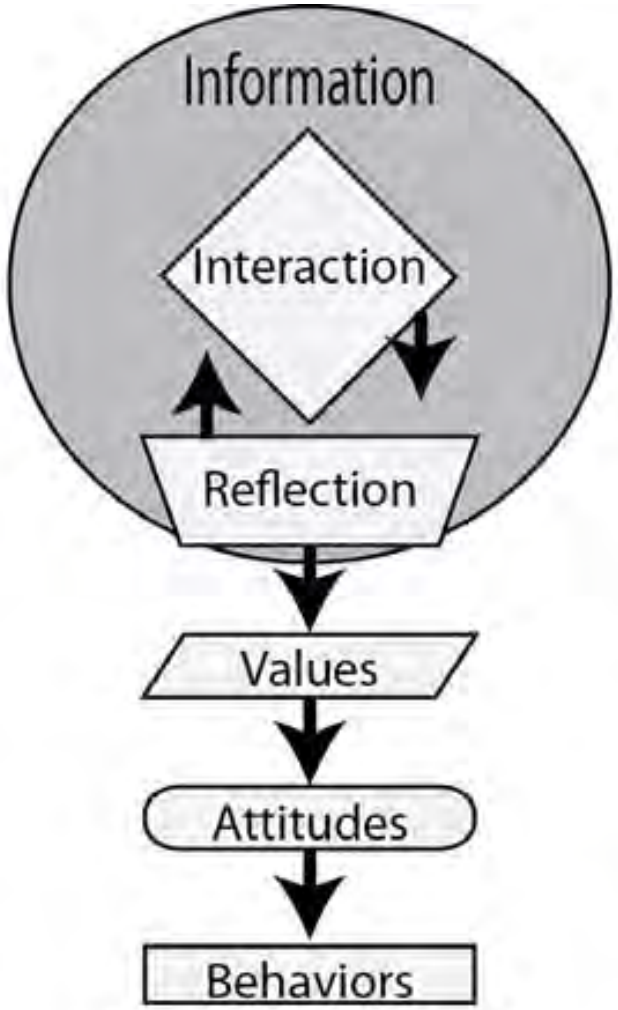
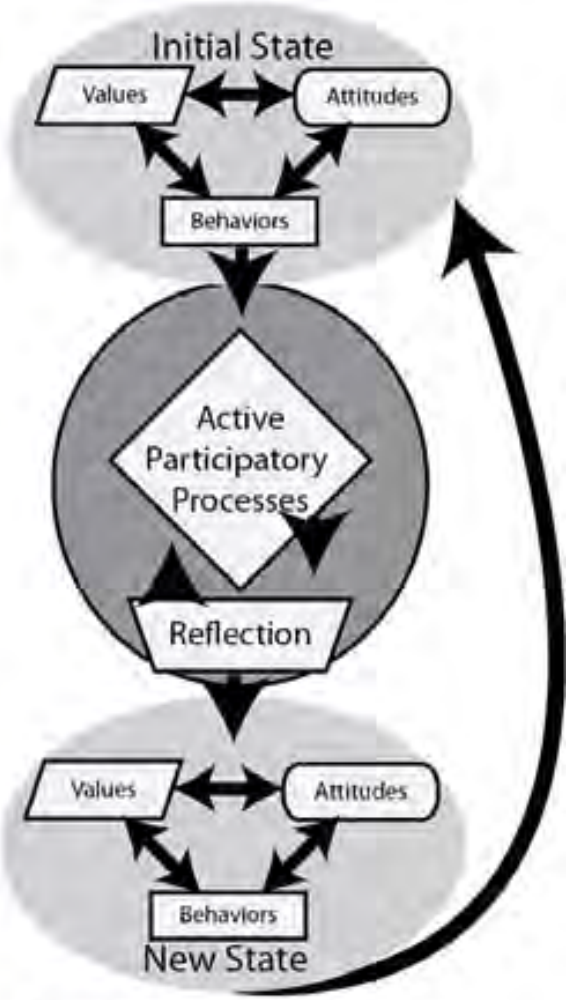



Information Deficit




Procedural Rhetoric




Emergent Dialogue

Three perspectives on behavior change for serious games
**Conference Paper (PDF Available)** · April 2013

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# Doom & Gloom & Powerlessness

https://flic.kr/p/bq4JLC

https://flic.kr/p/5fLgua

# Low Emissions

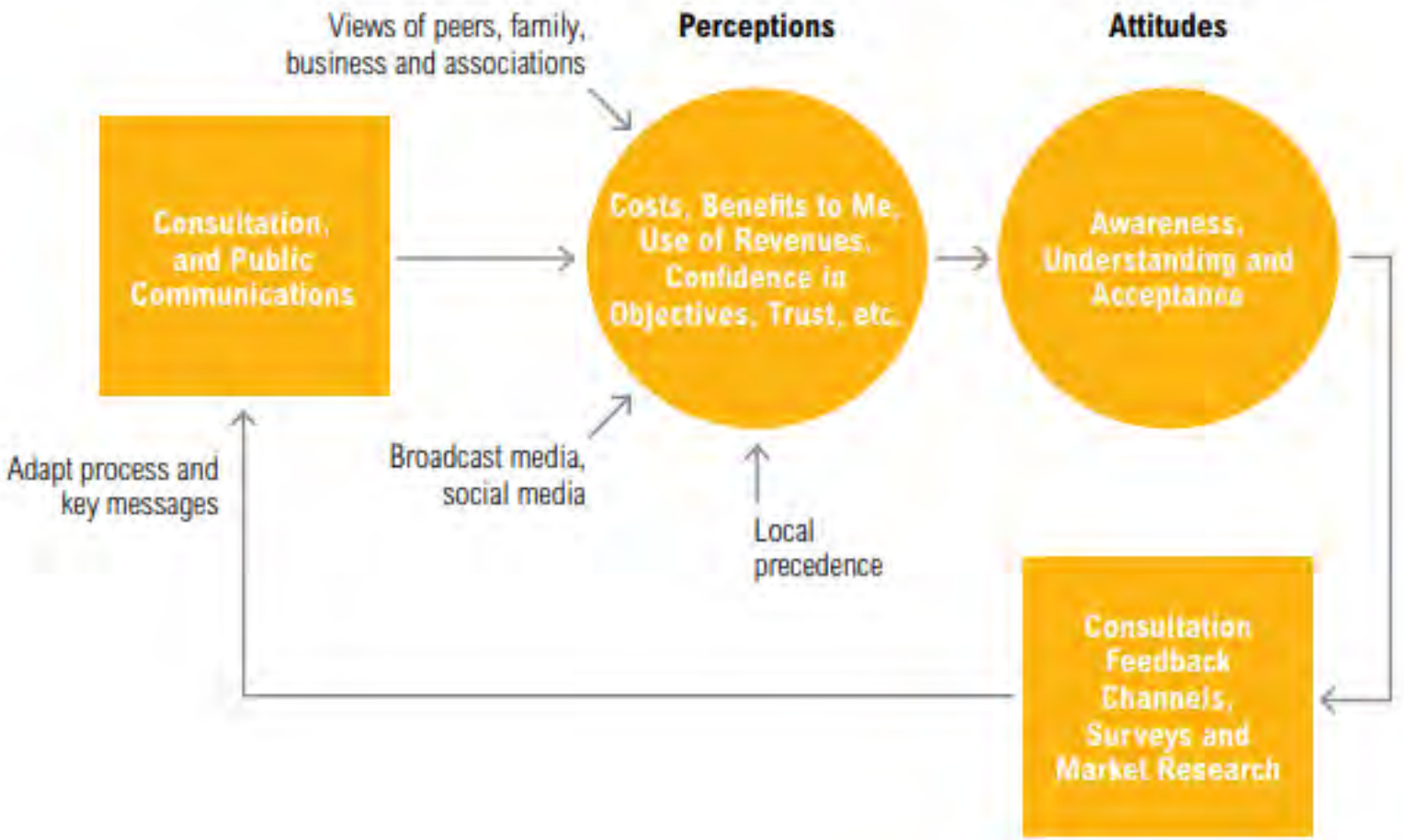
https://flic.kr/p/hK5KXw

https://flic.kr/p/cxuHqu


https://flic.kr/p/nxf68r

It’s good for the environment

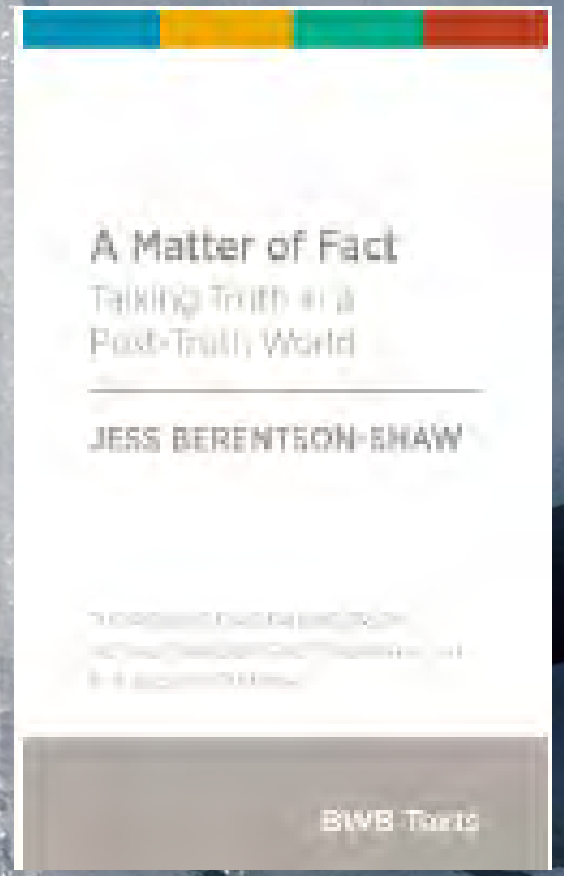
# Complexity of wicked problems




http://www.indiaenvironmentportal.org.in/files/file/international-case-studies-public-communication-and-consultation-strategies-low-emission.pdf

“I discuss how we can frame evidence about important social issues through the **lens of shared helpful values**. These sorts of frames lead to a greater likelihood that people will see and believe the evidence that scientists and researchers produce, but that is too often ignored or overshadowed in public debate.

**Frame evidence about climate change, for example, through values of care for each other (as opposed to our demise in a mega storm)**. People are much more likely to see and act on effective climate action evidence if you do.”



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## OBJECTIVE

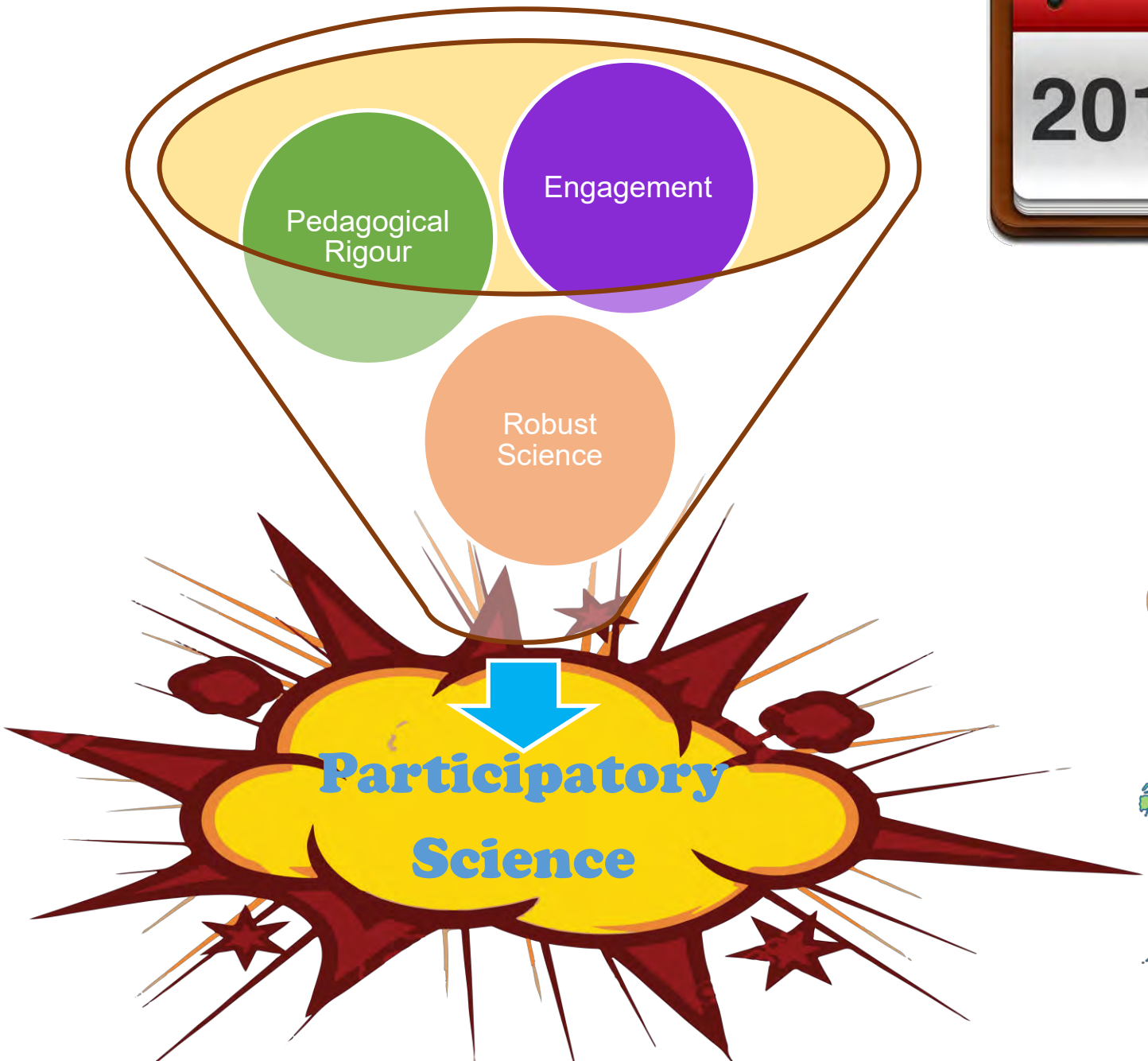
**ENCOURAGE AND ENABLE BETTER ENGAGMENT WITH SCIENCE AND TECHNOLOGY IN ALL SECTORS OF NEW ZEALAND**

## NEW ACTIONS

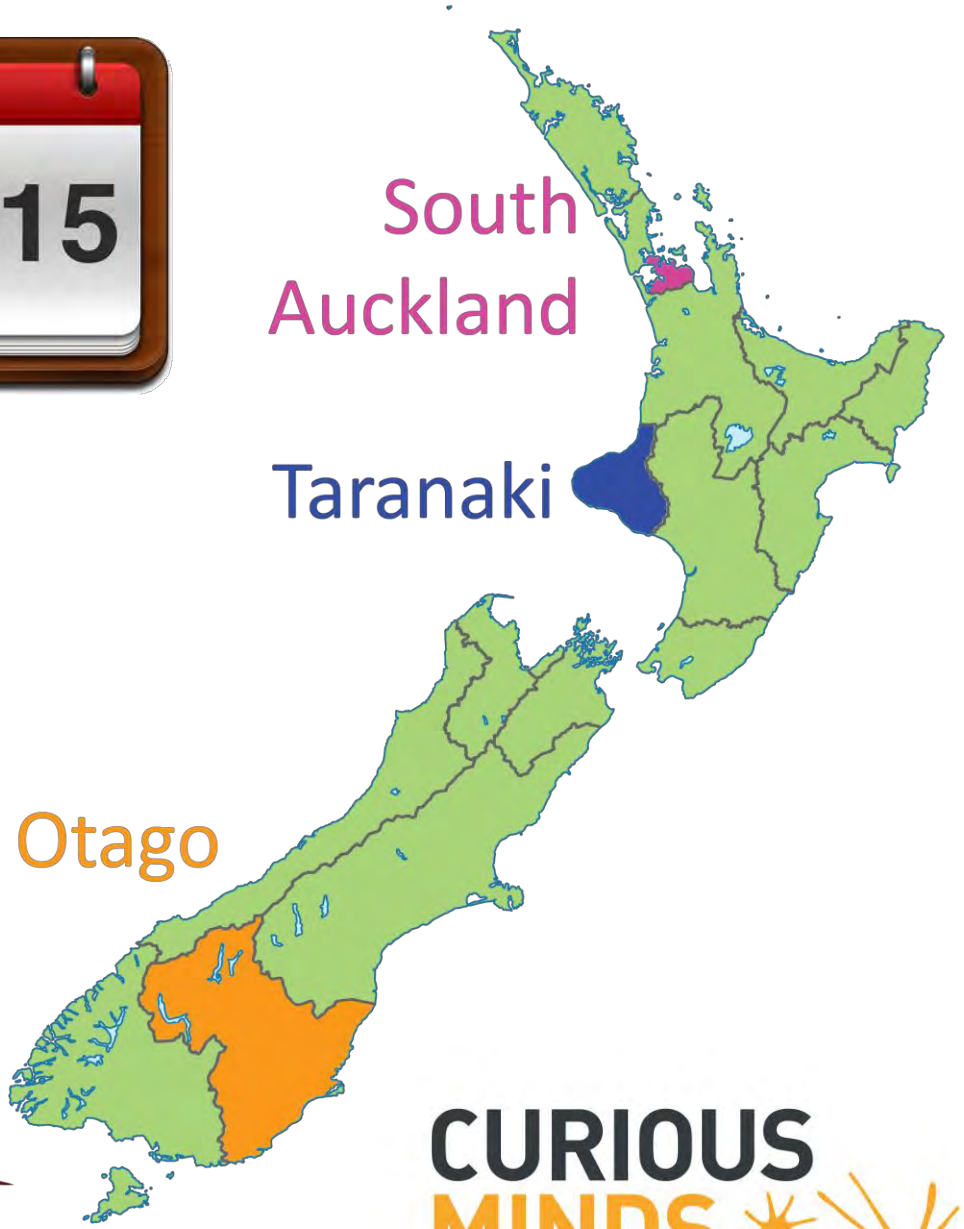
| ENHANCING THE ROLE OF EDUCATION | PUBLIC ENGAGING WITH SCIENCE AND TECHNOLOGY | SCIENCE SECTOR ENGAGING WITH THE PUBLIC |
|---|---|---|
| • Science Skills in Education initiative<br>• Teachers in Industry project<br>• Review positioning and content of digital technology within the New Zealand Curriculum/ Te Marautanga o Aotearoa<br>• Increase the science and technology content in initial teacher education | • New contestable fund for science and technology outreach and initiatives for harder-to-reach audiences<br>• Better connect business/ educators/learners/local government with the science sector<br>• Increase girls' participation in science/ICT study and careers<br>• Better connect museums/ zoos/science centres with the science community<br>• Parents and whānau to be more engaged with science | • Implement a participatory science platform<br>• The Royal Society of New Zealand to develop a code of practice for public engagement for scientists<br>• Public engagement in implementing the National Science Challenges<br>• Access to public engagement training for researchers<br>• Increase the profile of researchers in pūtaiao/ mātauranga Māori |

SUPPORTING ACTIONS

## PARTICIPATORY SCIENCE PLATFORM





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# Wakatipu Snow Study – AJ Mason

"It wouldn't have had same impact if hadn't had PSP format - allows people to engage and activates curiosity because it's practical and hands on.

Not been so much about informing the public about the science of snow, but about exposing them to the scientists of snow – actual trial and tribulations."

"I'm not trying to say that scientists are just normal people- actually I'm trying to put them on a par with firemen- they sweat and they work incredibly hard. I'm exceptionalising scientists, to get people thinking "they worked that hard to get that result, it must be worthwhile".

It's so important to also link in the humanities, we are doing this with historical photos."

https://flic.kr/p/hhnQ9y

# Wakatipu Snow Study – AJ Mason

"Make scientists firemen- create heroes. If you do *this (action)*, you will rescue/save these people. People will rally to this, rather than an 'eat your vegetables'. Turn climate change into a story of courage for all of us, for us all to be the hero.

It's not about changing truth or facts – it's about the framing in courage- the action itself is courageous.

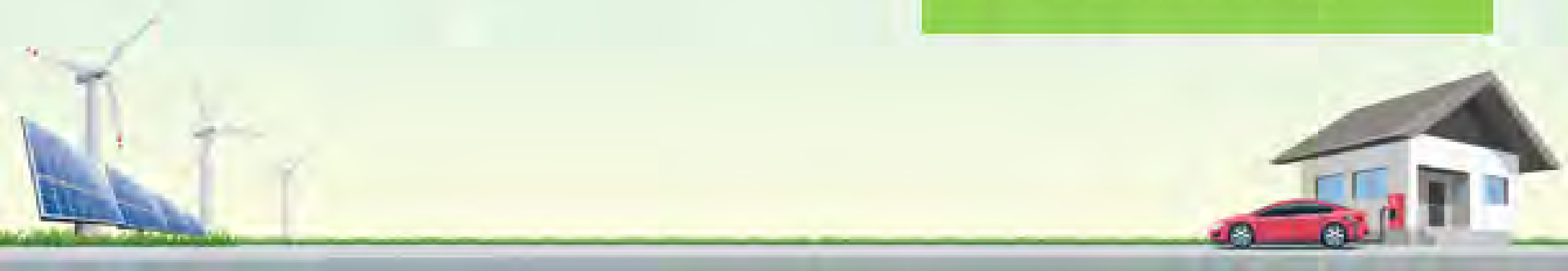
PSP gives the opportunity to frame things in the right way. Showing people the act of science and letting them experience science is important. "I had no idea that scientists work so hard".

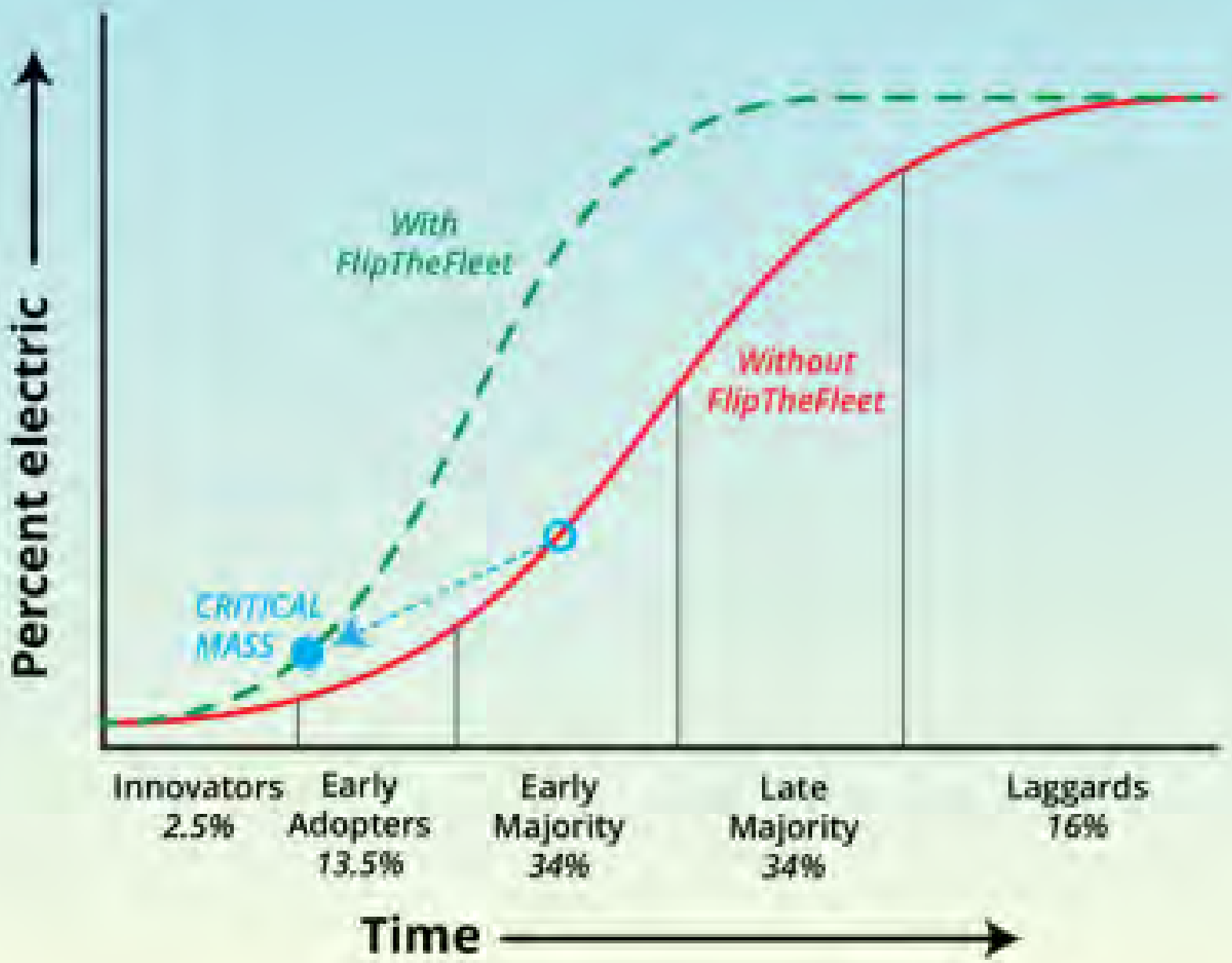
The communication medium we need is not facts and reason, but emotion instead."

https://flic.kr/p/2452Rgq

# Citizen science
## *"by EV owners, for future EV owners"*

- Public launch June 2017
- 918 EVs signed-up (7/6/2018)
- 20 'fleets'
- 5,246 monthly records
- 8-20 KPIs per monthly upload
- Monthly "1-click surveys"






E. Rogers (2003) Diffusion of Innovations

# Nissan's official response

"Nissan is aware that a limited number of customers have expressed concerns with the previous generation of the Nissan Leaf 30 kwh battery."

"Leaf owners are some of our most devoted customers."

"We take their concerns seriously, and have technical experts currently investigating the issues raised."

-- *EV communications manager, Jeff Wandell*


Preprint Article (to 23 May 2018)

- 9,238 Views
- 1,886 Downloads
- 15 critiques

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- Keeping data requests simple and fast
- Making the data uploading and reporting user-friendly
- Choosing performance measures that are personally relevant and expressed In units that people can easily weigh up
- It can provide a fast and penetrating data stream
- It's personally transformative for the participants and co-ordinators alike
- It can greatly assist sustainability transformations!

- Building in mechanisms for user feedback and co-design of the project and its tools so that members feel a sense of ownership and pride in their contributions

# Ideas to action

# Full STEaM Ahead – Opunake Primary (Lorraine Williamson)

- Kids doing enquiries were always asking if school could run out of energy
- Solution to power the kitchen garden
- Looked at all forms of electricity generation
- Wind generation focus
- Outcome was unexpected – gas stoves

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# Opunake


"raised awareness of environmental issues in the local context"

# Antarctic Time Travel

- Visitors were able to identify some the key take-home messages from the exhibition.
- Experiencing the exhibition resulted in a slight increase in the level of concern over the impacts of climate change.


# Antarctic Time Travel

- In the follow-up survey several weeks after the event, although most participants had entered a commit statement in Part 2, most now denied it. A number couldn't remember what they had entered.
- There was avoidance around answering these questions around the commit board with 54% answering N/A as to the extent that they had committed to their action. Low percentages of participants indicated that they were very or completely committed to their action (24% in total). Participants were also non-committal around whether they would commit in the future with most again choosing N/A.

# Far From Frozen – Craig Grant

- virtual reality and holographic experiences, hands-on interactive displays, and accessible demonstrations of climate change science together with its projected impacts (on NZ cities).
- engaged over 35,000 students, teachers and families at main centres and rural schools around NZ


# FfF goes to Niue & Cook Is

- Top ten most vulnerable communities to extreme weather events & rising sea levels
- Have had little exposure to, or communication of, science behind CC
- Successful mission


# Prof James Renwick

- Gives simple overview of scientific principles
- "Then, I aim to connect CC effects to local communities and the audience, in terms of local issues."
- "Balances approaches that "scare" people and those that give us "hope". I am not convinced that we need to focus on opportunities and hope as I think we all need a clear-eyed understanding of the dangers we face."


https://www.tvnz.co.nz/shows/breakfast/clips/expect-more-and-more-powerful-storms-like-hurricane-irma-as-climate-change-raises-world-temperatures
https://www.youtube.com/watch?v=Jy8qOmfwAc8

# “You don’t have to be a Carbon Jesus”

“Public don’t have a very good idea about what action is required. So we need to do better at communicating, and provide tangible action ideas. A positive future is often what people want to focus on. People want to feel empowered, not helpless or a lack of hope.

Ozone hole and climate change are all one for some people.

Best tangible action aside from public transport, lightbulbs etc is to talk about it with the people around you.

Have I made a difference though? I’m reaching mainly the engaged.”


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# Sophie Fern


Pondered the 'What things are going to be' rhetoric (technofuture, apocalyptic, agrarian-utopic):

- Avoid the apocalyptic – *"it makes me want to go to bed and never get up. Agrarian-utopia is fine if you're able bodied with time. The technofuture one is the one that most gets up my nose though. It's the "we don't need to do anything because "scientists" will come up with something that will save us" narrative. It allows us to take no personal responsibility as "they" will save us. Classic fairy tale heroine narrative. This is also a top down non-participatory approach."*
- *"still arguing whether climate change is even a thing or not, which takes all the energy away from possible futures."*

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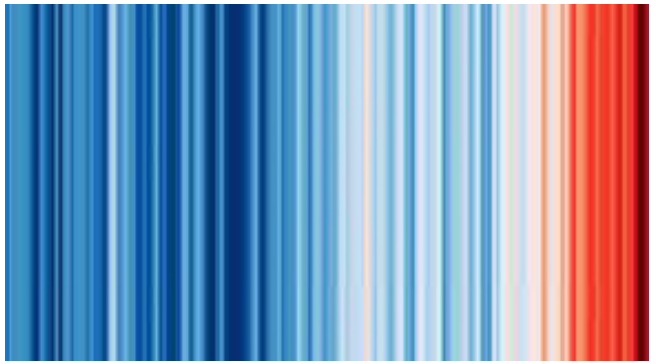
# Veronika Meduna

1. Inspire people to change their own behaviour to reduce their own carbon footprint or become active in calling on companies (their own workplace) and/or local authorities to mitigate emissions.
2. Building bridges: Any project that connects otherwise not well overlapping groups is always worth doing.
    1. E.g. Sarah Meads at Track Zero,
    2. Katherine Hayhoe's Twitter feed and public speaking (she's great at combining religion and science/climate - https://twitter.com/KHayhoe).

# Veronika Meduna

3. Visualisation: Ed Hawkins has done hundreds of stories about climate change with his data viz, from his initial  climate spirals to the current climate stripes.
4. Scientists speaking in their own voice. Any form of participatory science also falls into this - any place really where scientists are just ordinary people, meeting other ordinary people. But it can also be scientists writing - or taking a personal challenge (e.g. Shaun Hendy's year of no flying).



https://www.climate-lab-book.ac.uk/visualisation-resources/

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# Assoc Prof Rebecca Priestly

- *"most of the science communciation I've done, e.g., Listener articles and books, is preaching to the converted"*
- *"The thing that might have made a difference is my/our teaching, especially the MOOC Cliff and I did about Antarctica. We got an international audience and some students who started as climate change deniers reported changing their mind about CC over the course of the MOOC."*
- *E.g. One response: "... [being surprised by] gaining an insight into how the scientists interpret the geological evidence and analyse the composition of the rocks, fossils and air trapped in ice to piece together the story of how Antarctica has got to where it is today."* (Antarctica Online, Module 2, unpublished data)

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# Assoc Prof Rebecca Priestly

- *"Up until a few years ago, I would class myself as being more of a man-made climate change sceptic, than a follower. The key thing that this course has provided, is that it has left me in no doubt that man-made climate change is real and needs to be addressed; it is not what I expected to get from the course."* (ICE101X, Post-course Survey, unpublished data)
- *"I was immersed with stories from lives long past, adventures happening now, and information on climate change that people in my area of the USA balk at – that I balked at but don't anymore since I've been offered a new understanding of what's happening."* (ibid)

Rebecca Priestley, Jacqueline Dohaney, Cliff Atkins, Rhian Salmon,
Kealagh Robinson 'Engaging new Antarctic learners and ambassadors through flexible learning, open education and immersive video lectures'. *Polar Record*, accepted, in press

# Gabby O'Connor

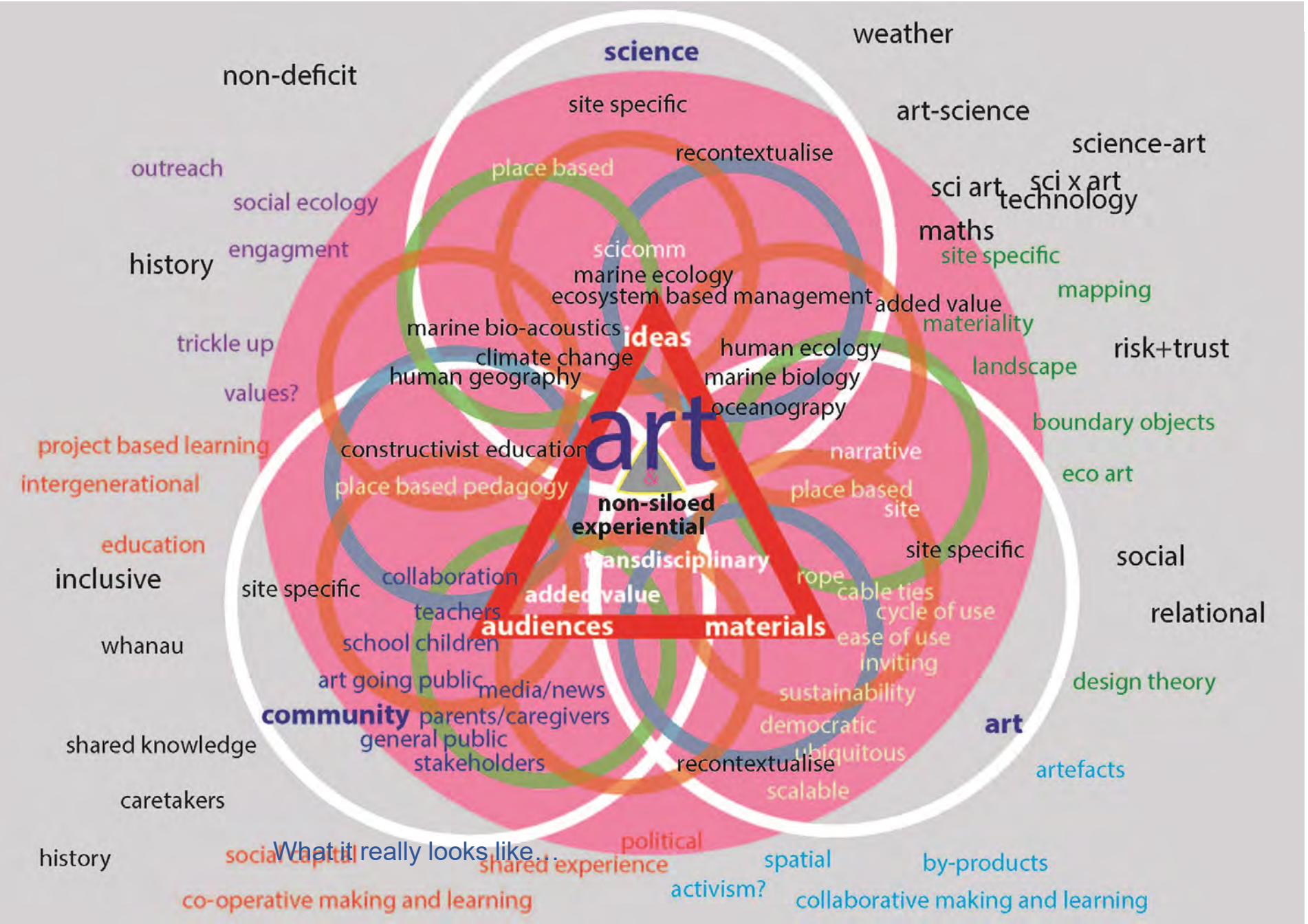
## Engaging Communities in Issues of Environmental Complexity through the Art-Science Nexus

**The Unseen**

**An Art, Science and Community Project**

(Intergenerational, transdisciplinary science communication: playing the long game)

BP26_0910.jpg (2017) https://data.linz.govt.nz/layer/93652-nz-10m-satellite-imagery-2017/history/


science
art
&
weather
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site specific
art-science
science-art
recontextualise
outreach
place based
sci art
sci x art
technology
social ecology
maths
engagment
scicomm
site specific
history
marine ecology
ecosystem based management
mapping
added value
marine bio-acoustics
materiality
ideas
trickle up
human ecology
risk+trust
climate change
landscape
human geography
marine biology
values?
oceanography
boundary objects
project based learning
constructivist education
narrative
intergenerational
eco art
place based pedagogy
place based
site
non-siloed
experiential
education
site specific
social
transdisciplinary
inclusive
collaboration
rope
site specific
added value
cable ties
relational
teachers
cycle of use
audiences
materials
whanau
school children
ease of use
inviting
art going public
design theory
media/news
sustainability
community
parents/caregivers
democratic
art
general public
shared knowledge
stakeholders
recontextualise
ubiquitous
artefacts
scalable
caretakers
political
history
social capital
What it really looks like...
spatial
by-products
shared experience
activism?
co-operative making and learning
collaborative making and learning


Targeted school kids to get families and communities

Trojan horse of art

National SCIENCE Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka


Hamish McCormick

# Place based

Hamish McCormick

Main strength is that connecting local environment to bigger piece  of puzzle – able to incorporate local knowledge and experience

Pilot Completed artwork on permanent display

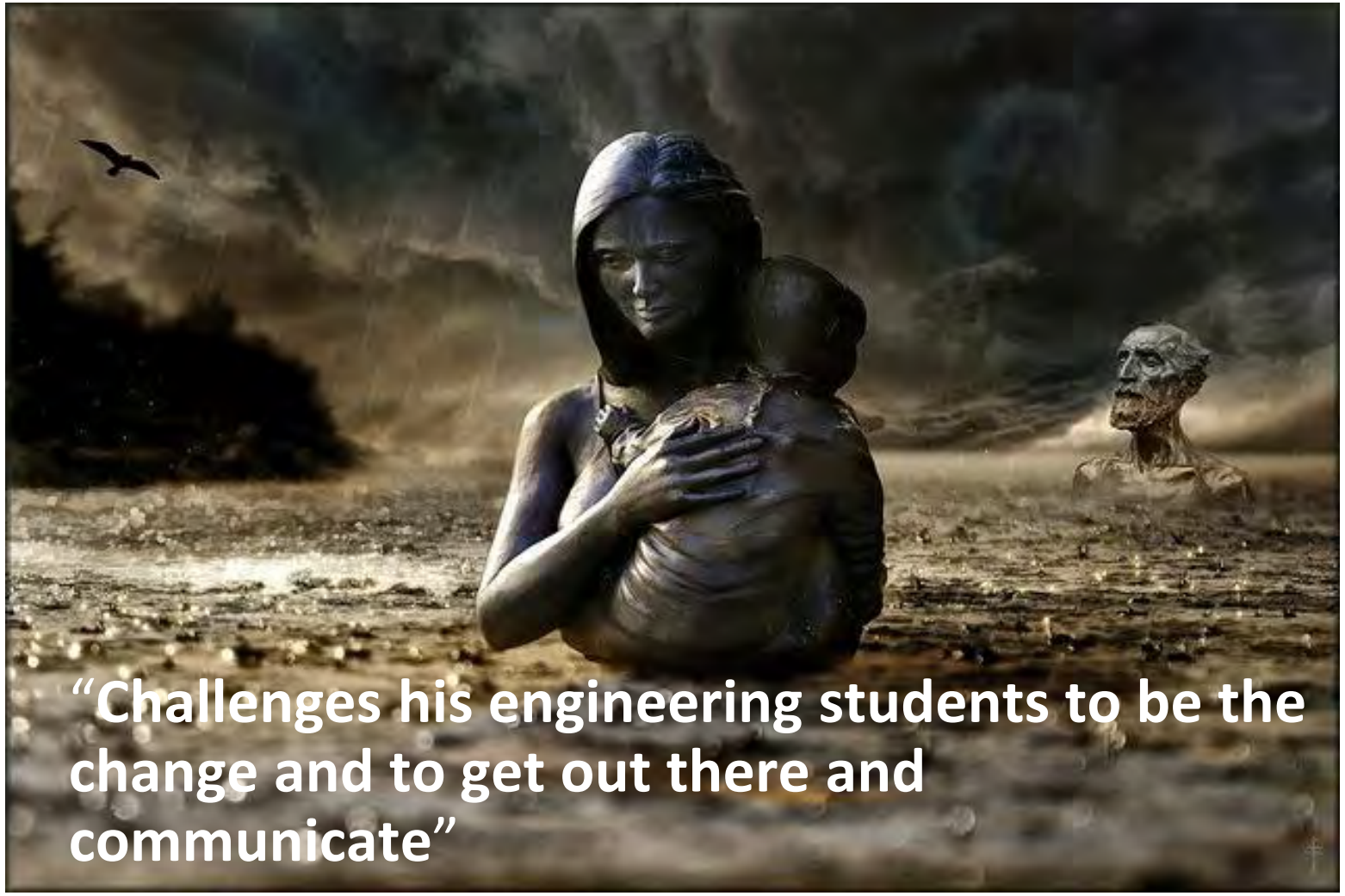
# normalise the convo

National SCIENCE Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka

# The Unseen: Statistics

- 16 schools in Nelson/Tasman/Marlborough/Wellington
- Approx 1600 participants including students, teachers, parents, general public, artists, conference attendees
- 39 workshops
- 15-180 participants per workshop
- 15km rope
- 35,000 cable ties
- 3 exhibitions so far

# Dr. Markus Pahlow, UC






https://flic.kr/p/X2thDW

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# Plastics momentum

https://flic.kr/p/dPjB2M

https://flic.kr/p/97JEUc

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https://putnam-consulting.com/philanthropy-411-blog/3-reasons-to-evaluate-your-grantmaking/

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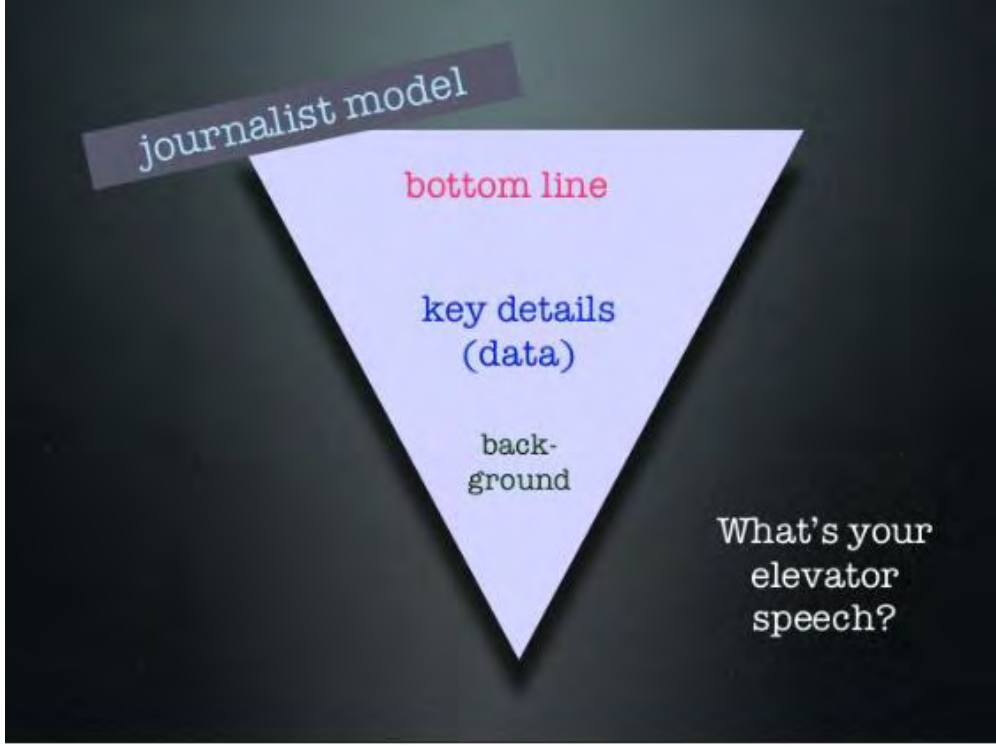
# Learnings




- Build optimism and hope
- Keep it simple
- Build in fun
- Use stories and metaphor/analogy
- Have many conversations; scaffold
- Use shared helpful values, know audience values
- Involve your audience's knowledge in the conversation

https://www.slideshare.net/stephaniechasteen/speaking-of-physics-the-art-of-science-communication/10-Science_Communication_Models1_scientic_literacy

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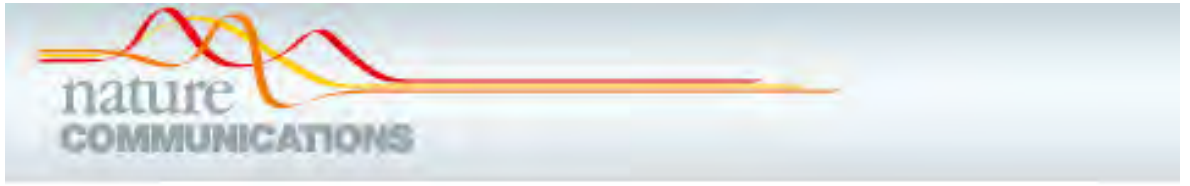
# Learnings




COMMENT

DOI: 10.1038/s41467-018-05977-w OPEN

Building optimism at the environmental science-policy-practice interface through the study of bright spots

Christopher Cvitanovic[1,2] & Alistair J. Hobday[1,2]

- Balance accuracy and interest
- Inspire and motivate to action
- Build a team = team sport
- Kids as the conduit
- Use participatory approaches + locally relevant/relatable
- Show scientist's stories, and as relatable humans/or superheroes
- Growth mindset and optimism – bright spots

# Learnings

- Transdisciplinary approaches to science and comms
- Awareness of interconnectedness
- Use visualisation
- Use art
- Placemaking – value of place. Communicating research and history and knowledge about a place, in the place where you are doing it


https://flic.kr/p/eWXcrN

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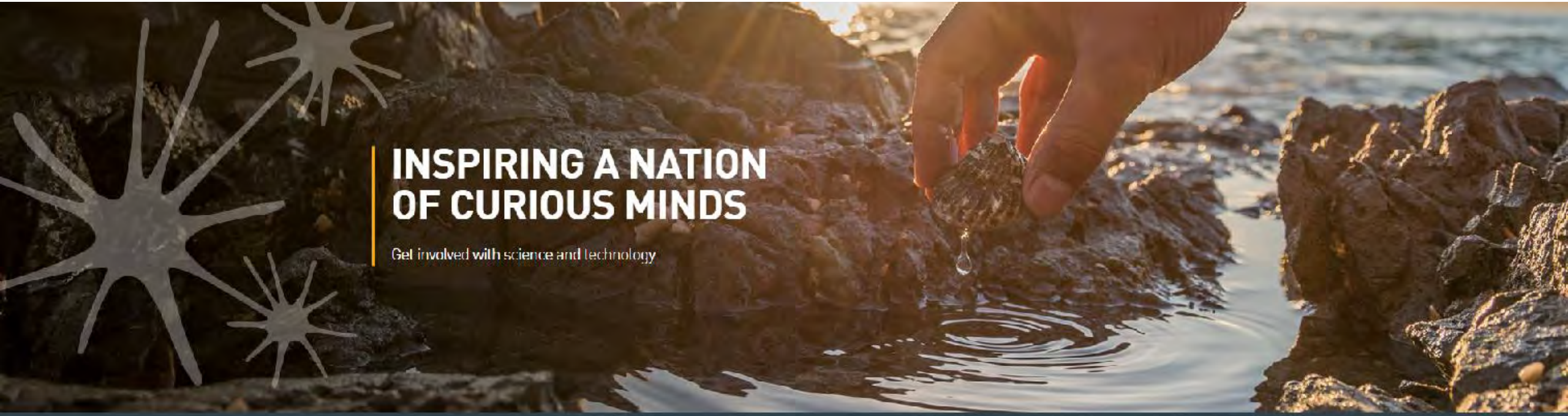
@VicMetcalf_NZ

@queenofcuriosity




# Curious Minds Ambassadors

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Office of the Prime Minister's Chief Science Advisor

New Zealand Government

# Building Blocks of Health Disrupted by Climate Change


EXPLORE | DISCOVER | SHARE

ROYAL SOCIETY TE APĀRANGI