Indigenous Science Network Bulletin

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Promoting First Nations' science, teaching & education

Christi Belcourt, *A Delicate Balance*, 2021, Acrylic on Canvas, approx. 5.5' x 7.5'. Collection of the Minneapolis Institute of Art.

For most Indigenous communities, all life— plants, animals, insects, microbes— are kin, and to be treated with respect and care. Most of the living beings that Native American artist Christi Belcourt depicts here are currently threatened, endangered, or at the edge of extinction.

FROM THE COORDINATOR

We present another bumper collection of articles and resources related to First Nations peoples and their science knowledge for a global audience of teachers, scientists and interested community members. Every three months I collate items for this bulletin and it appears that interest globally is steadily rising. When this bulletin first began in 1998, mainstream media interest in Indigenous affairs was minimal. Today there is a continuing output of Indigenous material flowing across all media platforms. I use search engines on the internet, plus whatever erupts on Twitter and Facebook. It is heartening to see such ongoing and widening interest. Consequently, I have added further sub-sections to the bulletin which align with the five regions of the globe to aid ease of access, as this edition has once again run well over 100 pages. In this issue we have stories from the following countries / First Nations peoples:

Australia: Aboriginal **–** Bundjalung, Bidjara, Ghungalu, Karajarri, Mandandanji, Dingaal, Gamilaraay, Martu, Mithaka, Nyikina Warrwa, Wangkumara Barkindji, Kunwinjku, Dja Dja Wurrung, Gidja, Wiradjuri, Walmajarri, Larrakia, Gooniyandi, Ngurrungurrudjba, Malak Malak and Matngala, Yolngu - Galpu, Djapu; Torres Strait Islands – Meriam, Dauareb, Mualgal
New Zealand: Maori – Ngāti Toa, Ngāti Rārua, Rangitāne o Rongomaiwahine, Ngāti Rakaipaka and Ngāti Kahungunu
USA: African American; Native American – Karuk, Yurok, Cherokee, Lummi, Ojibwe, Potawatomi, Lakota, Choctaw; Native Hawaiian
Canada: Apoqnmatulti'k, Dene, Łíídlıı Kų́ę́ or LKFN, Anishnaabek, Métis, Mi'kmaw, Gitxsan, Inuit, Iñupiaq
Mexico: Zapotec, Maya Ch'orti' and Binnizá
Kenya: Maasai
Finland / Sweden: Sami
Singapore, Melanesia, Philippines, India, Nigeria, Tanzania, Benin, South Africa, Bolivia

Indigenous and Western Science

We continue to look at the various definitions and understandings of the relationship between Indigenous Science and Western Science. One of our network members, A/Professor Michael R. Matthews, has written an article on the issue which takes a contrary position. He has extensive experiences promoting and analysing the nexus of culture and science, so although I cannot agree with some of his assertions, I must commend his work to you.

Our editorial is written by Dr. Jessica Hernandez, an environmentalist and author who is currently receiving wide praise across the globe for her Indigenous science themed book Fresh Banana Leaves. Another highlight of this issue is a story from the North West Territories of Canada: *The frontline of conservation: how Indigenous guardians are reinforcing sovereignty and science on their lands.* Containing a series of images and videos it is well worth a look. Also look closely at our cover image by Native American artist Christi Belcourt, there is plenty of beautiful detail!

Mark Linkson, Coordinator ISN, Cairns Queensland AUSTRALIA

Original artwork for the Indigenous Science Network from Tiwi designs by Jennifer Coombs, Melville Island, NT, AUSTRALIA

We acknowledge and pay respect to the past, present and future Traditional Custodians and Elders of the Aboriginal and Torres Strait Islander peoples of Australia and all First Nations peoples across the world. We celebrate and promote the continuation of their cultural, spiritual and educational practices.

Aims of the Indigenous Science Network

Originating from a meeting in 1998 of science educators and Indigenous community members in Darwin, Australia. We agreed that there should be a central place for Indigenous knowledge in any science curriculum. We have grown to cater for scientists, educators and Indigenous community members from across the world:

- To promote First Nations science, teaching and education
- To support all educators who would like to improve their knowledge and understanding of Indigenous science and how to access and use it in their teaching
- To involve Indigenous scientists, educators and community members who support the inclusion of Indigenous knowledge in teaching science and are open to dialogue and sharing about their own experiences.

Regional Correspondents (Note: we still require a volunteer for the PACIFIKA region)

AFRICA

Femi OTULAJA, University of Witwatersrand, SOUTH AFRICA
Keith LANGERHOVEN, University of the Western Cape, SOUTH AFRICA
Sina Joshua FAKOYEDE, Federal University Oye-Ekiti, NIGERIA

ASIA

Prem PHYAK, Chinese University of Hong Kong, CHINA
Indra Mani RAI, Tribhuvan University, NEPAL

AMERICAS

Coimbra SIRICA, Burness Global, USA
Wanda BAUTISTA, Burness Global, USA
Claudia LIEVANO, Burness Global, USA
Andrew DAVIS, Fundacion PRISMA, EL SALVADOR
Lucas TOLENTINO, Global Alliance of Territorial Communities, BRAZIL
Michel LAFORGE, Global Alliance of Territorial Communities, ECUADOR

EUROPE

Michael Reiss, UCL Institute of Education, London UK

ISN Facebook page and Twitter account

The Facebook page now has around 1420 followers and the Twitter account has 1510 followers (as at 11 May 2022). Most of these people are not official members of the network (not having supplied an email address) but some do contact us via those sites to be enrolled. It means we can improve and widen our reach by posting to those media.

Items posted on Facebook focus on Indigenous science, environmental, welfare and equity issues. More pointedly, the Twitter account covers many Indigenous issues, much more than just science and has contributions from First Nations peoples of all settler countries. If you are not yet a Tweeter, I would encourage looking into it. The Coordinator of this Network, Mark Linkson, has been running both these media but would be happy to share the load with other members if you are keen. The logos above contain hyperlinks to our live and continuing everyday media presence. However, the Bulletin is our most important and significant work, although some of the issues and stories that first crop up on social media do translate to future stories in the Bulletin.

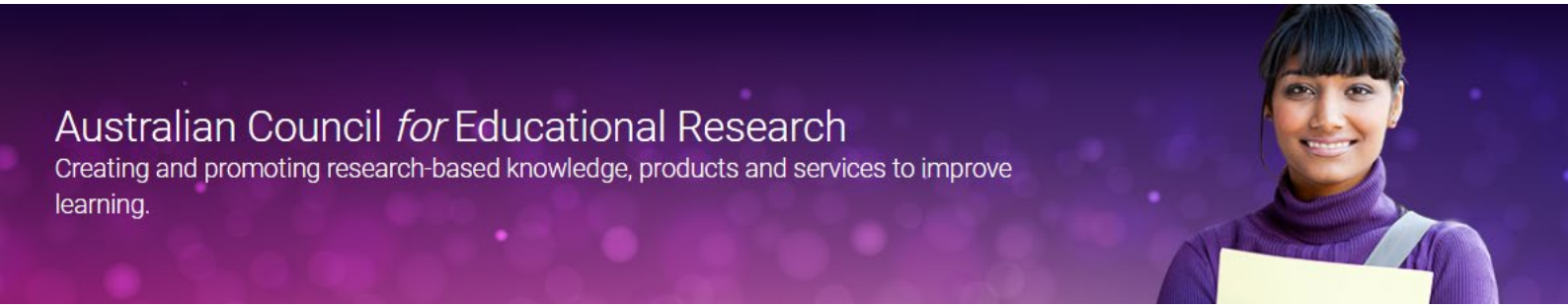
INDIGENOUS SCIENCE NETWORK: BULLETIN ITEMS

Items are listed under five headings being **News and Views; Resources; Papers; Indigenous Astronomy** and **Conferences / Seminars**. We further categorise some of these sections with sub-headers of **Australia** or **The World**, to make finding your areas of interest easier. (See the Contents tabled below). Starting from this issue, we also have sub-sections for each of five regions of the globe within **News and Views (The World)**. Weblinks for most items are contained as hyper-linked addresses or as hotspots within illustrations. Some items will not have links. All links were active at the time of publication (15 May 2022).

ACKNOWLEDGMENTS: This issue contains contributions from or reference to the following network members: Michael Matthews, Brad Moggridge, Mike Michie, Michael-Shawn Fletcher, Karlie Noon, Krystal De Napoli, Duane Hamacher, Coimbra Sirica, Ray Norris, Corey Tutt, Bill Liddle, Krystal Tsosie, Nancy Maryboy, Kirsten Banks and Patricia Forster (welcome to the network Pat). Apologies if I have missed anyone (let me know). Many thanks and to all members, your future submissions are most welcome.

NEW ONLINE HOME FOR THE BULLETINS AND THIS NETWORK!
All ISN bulletins since 1998 have been stored on Inaugural ISN Convenor Mike Michie's personal website and can be downloaded from there:

http://members.ozemail.com.au/~mmichie/network.html.



We are very pleased to announce that ACER (the Australian Council for Education Research) has agreed to host this network online and act as repository for our recent and future bulletins. We would like to thank especially Rebecca Taylor and Pru Mitchell of ACER for assisting with this huge improvement to our digital presence. Legacy editions of the bulletin (from 1998 to 2017) will still be available from Mike Michie's website. All network bulletins from 2020 onwards will be stored within the ACER webpages. Commissioning of the new ISN webpages by ACER's Online Services team is currently continuing and an opening date should be announced in the near future.

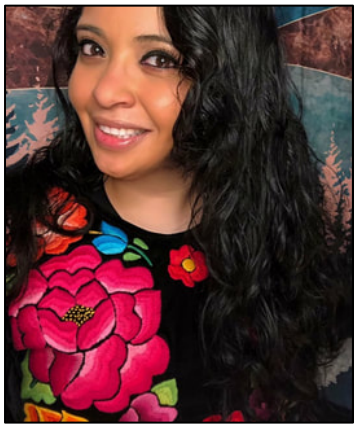
NETWORK ORGANISERS MEET
The current Coordinator of this network (Mark Linkson) met with the Inaugural Convener Dr Mike Michie in Darwin recently. Having begun the network in 1998, Mike was very pleased with the reinvigoration of his work and was in awe of the amount of new material that is being found and reported. Live long and prosper Mike!

After yarning over a latte at the famous Cool Spot in Fannie Bay, Mark (left) and Mike (right) grab a selfie under nearby pandanus trees. 11 Apr 2022

Contents

Aboriginal and Torres Strait Islander people should be aware that this bulletin may contain images and names of deceased persons.

INDIGENOUS SCIENCE NETWORK EDITORIAL: MAY 2022



Dr. Jessica Hernandez *(Binnizá & Maya Ch'orti') is a transnational Indigenous scholar, scientist, and community advocate based in the Pacific Northwest. She has an interdisciplinary academic background ranging from marine sciences to environmental physics. Her work is grounded in her Indigenous cultures and ways of knowing. She advocates for climate, energy, and environmental justice through her scientific and community work and strongly believes that Indigenous sciences can heal our Indigenous lands.*

Her book Fresh Banana Leaves: Healing Indigenous Landscapes through Indigenous Science (2022) breaks down why western conservationism isn't working–and offers Indigenous models informed by case studies, personal stories, and family histories that centre the voices of Latin American women and land protectors.

Many Indigenous languages lack a word for 'conservation.' Here's why.

There is no word for conservation in many of our Native and Indigenous languages. While there are some phrases close to what conservation means in Zapotec, most of these words relate more to "taking care of" or "looking after," which is not truly embodying what conservation means. When healing landscapes, the word that is used to do this is coined as restoration. Restoration teaches us that in order to heal a landscape, we must get rid of all the invasive species that are known as weeds. However, this fails to truly heal the entire landscape as it only focuses on one component, invasive species, and not on other factors that might be impacting the entire ecosystem or landscape. I have sat in many presentations about invasive species where they have been called the devil, evil, or nightmares. However, the irony that lies within these descriptors is that for many who practice restoration or are in the environmental sciences, most of these invasive species are their plant relatives as these were introduced during colonial times by settlers and colonizers.

What this means is that many white people have lost their ancestral roots due to the assimilation the Americas have undergone and, as a result, they have lost their relationships with the same plants they now deem as terrible beings. Yes, invasive species harm an entire ecosystem, sometimes outcompeting all native plants in this same landscape; however, we are taught as Indigenous peoples that regardless of whether this plant belongs there or not, we must ask its spirit for permission. As I shared before, we acknowledge them as displaced relatives rather than invasive species, since at the end of the day, they are also someone's plant relatives. What Western conservation, environmental sciences, and restoration continue to teach us is that anything that is not native is not welcomed to the flora or fauna landscapes. However, this rhetoric is never applied to humans as we seem to be the exception for our own laws, rules, and regulations that we only apply to our environments. This alienation is only applied to vulnerable communities such as our Central American climate and war refugees because they are ostracized thanks to current immigration laws.

Removing invasive species without good intent or connecting with them causes scars. When I was taught restoration practices in my academic courses, I was taught to work hard and fast to complete the task. In my courses, relationship building and asking for permission were never mentioned when we were instructed to remove the invasive plant species or weeds. Being the only Indigenous person in many spaces, we sometimes opt not to speak up or mention anything as sometimes we are questioned, ridiculed, and labeled as ignorant. Yes, most of our practices do not make sense under the Western science

lens, but we should not have to alter or adapt our knowledge systems to fit the Western science lens. Our Indigenous knowledge and practices should be acknowledged. I recall the many times I was ridiculed by white teachers and professors, and this instilled in me some form of shame that took years to heal from. This happens a lot in academic spaces as we are deemed to be ignorant, naïve, and inferior, and many continue to hold to these unconscious biases that end up harming not only their Indigenous students but also their Indigenous colleagues and people outside of the academic realm.

My experiences as an Indigenous student in the environmental sciences have shaped how I teach and navigate my own courses. That young Indigenous woman who was sometimes ashamed to share her teachings or knowledge is now leading and teaching such courses, so I ensure I center my own teachings. This makes a difference to Indigenous students as many of them have come up to me and told me that my class was a space where they did not just feel welcomed but also acknowledged. While they may be quiet and timid in other courses, they are eager to share their knowledge and cultures out loud in my courses. I wish they felt this sense of belonging in all their courses, but given the few Indigenous faculty members across universities, especially in the sciences, there is a long way we have to go as a nation that continues to have educational disparities.

I recall when I taught my first restoration class, one of my students pointed out the language I used and how this was different to him because professors tend to use academic jargon and terminology that is not accessible to those not in academia. He deeply appreciated my use of nontypical language because he did not have a Western science background and felt more at ease with the language I was using. Yes, I would use words and phrases like, friends, they do not like each other, or displaced relatives when I referred to the plants (flora) of the landscape we were restoring, then go on to explain to students what the equivalent of these relationships was in Western science. For example, the phrases they do not like each other or friends refer to the competitive or mutual relationships plants can exhibit with each other. These relationships are identified through plant guilds. Plant guilds allow us to find out which plants can coexist and thrive in the same community as some might outcompete other plants for nourishment or even sunlight.

For me, healing Indigenous landscapes means centering non-Western ways of thinking, learning, and teaching. I can give a long presentation on plant relationships using scientific terminology, but it is best to frame it through a discourse that everyone can understand, and that includes my parents, who do not have an extensive Western education. My mother comes from a family of nine siblings, so she was only able to make it to the sixth grade, and my father did not have the opportunity to get any education as at a young age he lost his father, had to work, and then survive the war. I always tell myself that if my parents cannot understand what I am doing in my scientific work, I am not just failing them but also my entire communities, as educational opportunities continue to be granted to them.

By integrating not only non-academic terminology but also hands-on projects in my restoration course, I was able to offer students a metaphor that explains colonization and the impacts it has on Indigenous peoples. After completing their restoration service hours, my students would complain about the cuts the invasive species would sometimes leave on their arms and legs. I would tell them that after one or two cuts, they would get used to it. However, we were removing Himalayan blackberry (*Rubus armeniacus*), and these are known for their long thorns that can penetrate about anything, even the protective gear we had on. Yes, they were hard to remove, and the cuts they would leave would hurt. Since I was doing the restoration work almost every day, the cuts would make it hard for me to wash my hands as it stung with soap or even just water. Therefore, I did understand what they were referring to; however, the cuts the Himalayan blackberry would leave reminded me of using this as a metaphor to teach my non-Indigenous students about the pain colonization has left on Indigenous peoples and communities.

The metaphor related to the pain these cuts would leave and how they symbolized components of the pain we Indigenous peoples continue to endure because of settler colonialism. This was also a percentage of that pain we carry as Indigenous peoples, because colonization has hurt us, fractured our communities, and continues to impact our Indigenous landscapes. Many of my students were non- Indigenous so using this metaphor allowed them to metaphorically grasp the pain. We were working in an urban space that was reclaimed by Indigenous peoples in Seattle and this allowed them to understand metaphorically the sacrifices that were made for this space to be reclaimed within an urban park. They witnessed how the twenty acres of land that was leased to the urban Indigenous organization that oversees Daybreak Star Indian Cultural Center had not been restored like other parts of the park. This is a 534-acre urban park and the walkways for tourists and pedestrians were cleared and maintained. However, once you walked into the jurisdiction of Daybreak Star Indian Cultural Center, there was no restoration work that was taking place or had been done there by Seattle Parks and Recreation. This meant that we were removing wild blackberries that towered over my five-foot stature—invasive wild blackberries whose roots were very thick and deeply embedded on the ground. Yes, my arm experienced a lot of pain and soreness as I led overall ten different groups of students in this restoration project. But that pain still does not resemble the pain that I carry as an Indigenous woman who is trying her best to continue uplifting her communities within the environmental discourse.

Restoration work is physically exhausting. However, it allows me to connect to the landscapes that are foreign to me as a displaced Indigenous woman. I strongly believe that we must build relationships with the Indigenous peoples whose land we occupy as well as the lands themselves. This means that we must provide our services and build these relationships through actions that support them both. I navigate new foreign landscapes knowing that they carry someone's animal and plant relatives, and these places are where someone's ancestors and spiritual guides continue to navigate. I reflect on the impacts the Indigenous peoples from these lands are facing. In my new environment in Seattle, I think of how the Duwamish people, whose lands this city was built on and who continue to reside here, have not even received federal recognition and are not consulted on city planning initiatives, policies, and management practices. Settlers must learn their own history and the role their ancestors played in this history, and also the Indigenous history that brings to light the atrocities, genocide, and violence that were enacted on the Indigenous peoples of these lands.

As an Indigenous woman of the Americas, I carry the history of the pain my ancestors had to endure, and in order to heal our landscapes we must heal ourselves as well. Everything that impacts us ends up impacting our environments as we are not separate from nature. We are a part of nature, and what impacts us impacts our nature and vice versa. Our Indigeneities are attached to this relationship with nature. Healing our landscapes ultimately means that land should be returned to Indigenous peoples and that we need to start calling out the colonial legacies that sometimes tourism advocates for. Tourism continues to further displace Indigenous peoples from their ancestral lands while also leading to environmental impacts and degradation.

Professor Jason Sharples FTSE, elected new fellow of the Academy of Technology and Engineering (ATSE).

Professor Jason Sharples is a mathematical scientist and internationally recognised expert in dynamic bushfire behaviour and extreme bushfire development. His research has extensively influenced policy and practice in Australia and internationally. The recommendations of the NSW Bushfire Inquiry into the 2019-20 bushfires are framed by Jason's research. Using complex predictive mathematical models, Jason aims to prevent big fires forming by forecasting danger periods and predicting areas where small fires could develop into big ones. He directs several national research projects and contributes to international professional dialogue. A Bundjalung man, Jason says Indigenous Australians have been innovators and scientists for thousands of years, a heritage that can continue today, especially through fire and land management.

"WHEN YOU THINK OF AN ABORIGINAL OR TORRES STRAIT ISLANDER KID, OR IN FACT, ANY KID, IMAGINE WHAT'S POSSIBLE. DON'T DEFINE US THROUGH THE LENS OF DISADVANTAGE OR LABEL US AS LIMITED. TEST US. EXPECT THE BEST OF US. EXPECT THE UNEXPECTED. EXPECT US TO CONTINUE CARRYING THE CUSTODIANSHIP OF IMAGINATION, ENTREPRENEURIAL SPIRIT AND GENIUS. EXPECT US TO BE COMPLEX. AND THEN LET US SPREAD OUR WINGS AND SOAR HIGHER THAN EVER BEFORE"

(THE IMAGINATION DECLARATION OF THE YOUTH FORUM READ AT GARMA 2019).

Teachers of STEM Initiative

(Tolita Dolzan, Stronger Smarter Institute: 17 Feb 2022)

When Tolita Dolzan implemented Stronger Smarter in the classroom, her students told her that her lessons were awesome and learning Maths was fun. Tolita is a participant in the Institute's Teachers of STEM Initiative (ToSI) which is supporting her to gain her teaching degree. Tolita explains that her career in education started with volunteering at her daughter's school, leading to work as a teacher aide and now as an education officer for the Aboriginal and Torres Strait Islander students. After having a family, she thought the opportunity had passed for her to become a teacher. However, she says her Teachers of STEM scholarship has been an enabler. "Doors are opening up," she says. "It's my time now, I guess. It's becoming quite an adventure."

Tolita says she grew up not really knowing about her culture and her uncle has been able to answer a lot of questions for her. "I found out who I was. I started feeling stronger in myself and having more voice. It has all unfolded into being an education officer here for the Aboriginal and Torres Strait Islander students and from that came the drive to pursue getting a teaching degree." In 2021, Tolita attended the Institute's Jardibirrijba and Jardi Dadarrinyi programs as a part of the ToSI program. These programs show how Indigenous Knowledges are linked to STEM and how that can be used in the classroom. Tolita says she hadn't realised how much STEM is a part of every day life. "I love going out on Country and it's just amazing what nature and the environment puts in front of you. You're learning every second of every day and it's really hands on. I've realized how much more potential there is to share those Indigenous Knowledges through STEM."

Story rocks game that Tolita created to provide Indigenous resources to use in class.

Scholarship applications open again in July for 2023. More information can be found here
https://strongersmarter.com.au/teachers-of-stem-initiative/

Failure to recognise 'Aboriginal English" is jeopardising many First Nations children's educational outcomes *(Bertrand Tungandame, NITV Radio: 21 Feb 2022)* Link

The language backgrounds of Aboriginal and Torres Strait Islander children who do not speak Standard Australian English as their first language must be recognised and valued in order to improve their educational outcomes. So says Dr Carly Steele of Curtin University.

Unprecedented Australian Bushfire Intensity Linked to British Colonization

(Eurasia Review: 21 Feb 2022)

British colonisation of Australia, together with the effects climate change, is likely to have contributed to the recent catastrophic wildfires in southeast Australia, a new study has found. An international team of researchers, led by the University of Nottingham (UK), have examined the land cover changes that occurred after the British settlement in southeast Australia, which started in 1788. By extracting tiny fossilised grains of pollen that are laid down in layers of ancient sediment in wetlands and lakebeds, the scientists were able to develop a picture of vegetation in the past. In a world first, they used pollen modelling techniques to find out what the vegetation was like at 52 different sites before and after 1788. The experts discovered evidence of denser vegetation in forests and woodlands following colonial settlement. They found that forests in the southeast are now much denser than they were before 1788 and have become more flammable due to the amount of woody biomass there.

The researchers found an increase of shrub cover by as much as 48%, with an overall average increase of 12% – which the researchers say, considering the vast area covered by the study, the "increase in biomass is massive". In the study, published in the academic journal *Frontiers in Ecology and the Environment*, the scientists say the increase in 'shrubbiness' is linked to indigenous burning practices ceasing. Dr Michela Mariani, lead author and Assistant Professor in the School of Geography at the University of Nottingham, said: "We know from historical reports that much of the landscape in early colonial southeast Australia was similar to an open savanna with grassy areas and large gaps between trees. This was described by an early English explorer as 'a gentleman's park', very much reminding him of England."

The Orroral Valley Fire viewed from Tuggeranong in southern Canberra, Australia. *Photo Credit: Nick-D, Wikipedia Commons*

You Retweeted

Science at Melbourne
@SciMelb

Research shows that bushfire risk in Australia has increased since European colonisation, suggesting that Indigenous land management is the key to a more sustainable future. A/Prof @theotheroad features in this @ConversationEDU article. Tap to read ▶

theconversation.com
World-first research confirms Australia's forests became catastrophic fire risk ...
Indigenous fire management holds the key to a safer, more sustainable future on our flammable continent.

10:00 AM · Feb 22, 2022 · Sprout Social

You Retweeted

Victor Steffensen @V_Steffensen · Mar 20

Different indigenous fire application today with a country full of weeds. First burn of of two applications this year. This is what we have to do to make country have less flammable vegetation. Walk through, More time and love put into country.

4 83 356

Indigenous Science

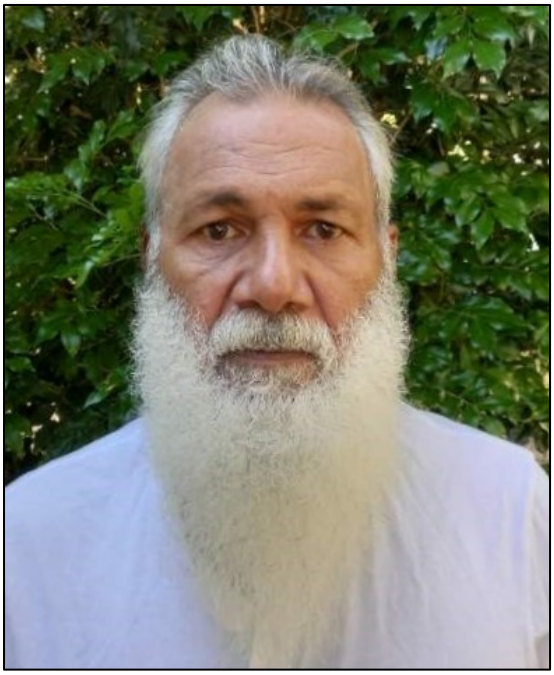
The Bulletin of the Indigenous Science Network is distributed four times a year via email directly to members. Membership is open to all. If interested in being a part of the Network, please contact the Coordinator via email at IndigenousSciNet@yahoo.com. Issues distributed in February, May, August and November each year.

2021 Indigenous STEM Awards

(CSIRO: accessed 15 Feb 2022)

The Indigenous STEM Awards recognise and reward the achievements of Aboriginal and Torres Strait Islander STEM professionals and students as well as schools, teachers and mentors working in Indigenous STEM Education. Since the launch of the Indigenous STEM Awards in 2016, 44 winners and 120 finalists have been recognised for their outstanding contributions in science, technology, engineering and mathematics (STEM). There are seven categories of awards that cover high school and undergraduate students, STEM professionals, schools, teachers and mentors.

2021 Indigenous STEM Champion Award



Milton Lawton, On Country Teacher, Woorabinda, QLD
With firm roots in the community, as the son of a Bidjara man and a Ghungalu woman, Milton has conducted On Country class for many years and recently, for Woorabinda State School. The classes Milton has developed include the science of plant growth focusing on the traditional removal of bark, a cultural connection camp for girls and boys, and the history of Indigenous involvement in livestock and horses. All activities tell the story of natural science and First Nations culture, and a demonstration of the value of education in developing strong young people.

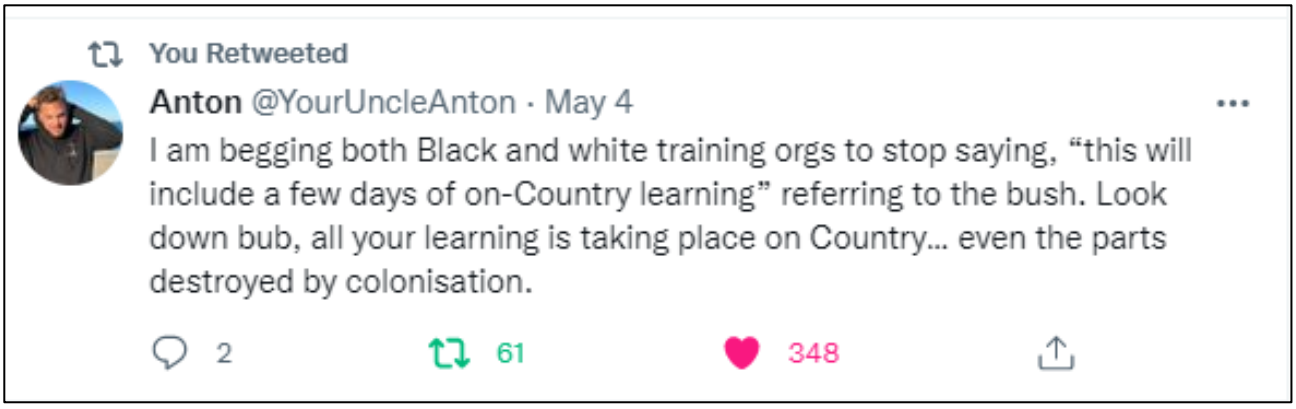
Milton is instrumental in the Junior Ranger Program and the Greening Australia Healthy Country Plan for Woorabinda. His next step is to develop the Ranger Program which will implement this plan. Milton is currently authoring a series of books which address the life cycles of various local animals and their connection to place, with people in the community engaged to ensure local readership and support of this knowledge.

For all the other winners from 2021, please view here.

CSIRO Seeking Aboriginal and Torres Strait Islander writers of STEM [Link]

CSIRO's Double Helix magazine is actively seeking Aboriginal and Torres Strait Islander writers to contribute to our publication. We cover science, technology, engineering and maths. Our articles are written for students aged 8 to 14 years old, reaching an audience across Australia. Each issue of the magazine includes a minimum of 2 pages showcasing Indigenous science, noting we seek to include more where possible. We're looking for Indigenous writers for snippets and/or features sections of our magazine, including but not limited to Indigenous science. Freelance writers are paid on a per-word basis for articles that appear in Double Helix. Or, if you're a school-aged student, get in touch to discuss mentorship opportunities. To express your interest and pitch your story ideas, contact the Editor:

Jasmine Fellows
Helix.Editor@csiro.au
02 6276 6017



(Joe is one of our ISN First Nations Advisory Board members)

Five Aboriginal and Torres Strait Islander scientists awarded

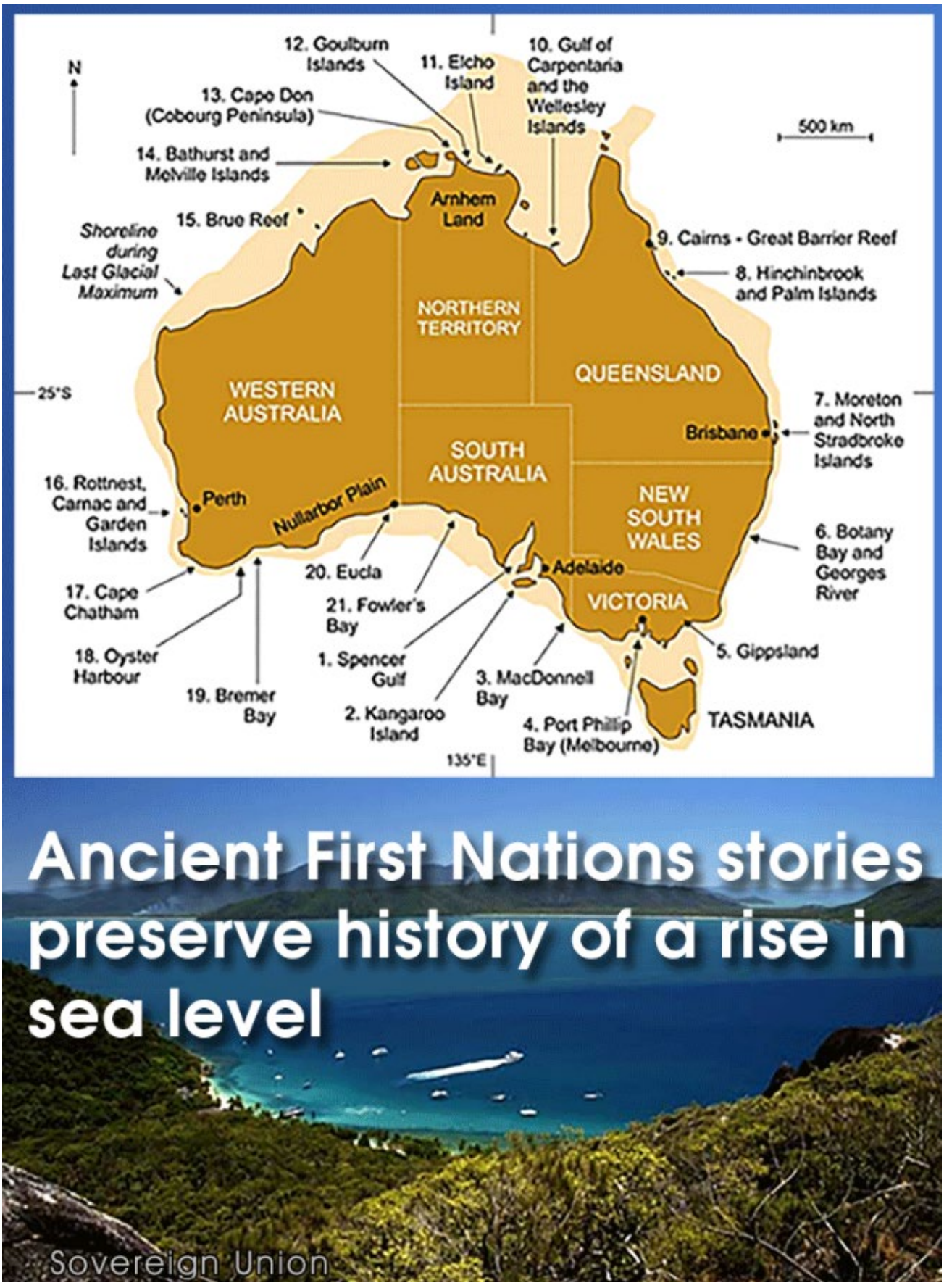
(Australian Academy of Science: 9 Feb 2022)

Five promising researchers from universities around Australia are the 2022 recipients of the Australian Academy of Science Aboriginal and Torres Strait Islander Scientist Award. The award recognises research in the physical and biological sciences, allowing interdisciplinary and sociocultural research that could straddle the social sciences and humanities, by outstanding Aboriginal and Torres Strait Islander PhD students and early- and mid-career scientists.

Dr Jordan Pitt, University of Adelaide
Tamara Riley, ANU
Vanessa Sewell, University of New England
Dr Keane Wheeler, University of Queensland
Luke Williams, RMIT University

The Aboriginal and Torres Strait Islander Scientist Award aims to support recipients' research and in some cases the expansion and growth of their research networks and international knowledge exchange through visits to relevant international centres of research. Awards are up to $20,000, with additional support provided to attend the Academy's annual Science at the Shine Dome event. The 2023 Aboriginal and Torres Strait Islander Scientist Award will be opening in early March 2022.

The Academy is committed to advancing reconciliation, creating opportunities to work respectfully with Aboriginal and Torres Strait Islander peoples, supporting their contribution to scientific activities, and increasing understandings of Indigenous knowledge.


N
12. Goulburn Islands
11. Elcho Island
10. Gulf of Carpentaria and the Wellesley Islands
13. Cape Don (Cobourg Peninsula)
500 km
14. Bathurst and Melville Islands
Arnhem Land
15. Brue Reef
Shoreline during Last Glacial Maximum
9. Cairns - Great Barrier Reef
8. Hinchinbrook and Palm Islands
NORTHERN TERRITORY
QUEENSLAND
25°S
WESTERN AUSTRALIA
7. Moreton and North Stradbroke Islands
Brisbane
SOUTH AUSTRALIA
16. Rottnest, Carnac and Garden Islands
Perth
Nullarbor Plain
NEW SOUTH WALES
6. Botany Bay and Georges River
20. Eucla
Adelaide
17. Cape Chatham
21. Fowler's Bay
VICTORIA
18. Oyster Harbour
1. Spencer Gulf
5. Gippsland
3. MacDonnell Bay
19. Bremer Bay
2. Kangaroo Island
4. Port Phillip Bay (Melbourne)
TASMANIA
135°E
Ancient First Nations stories preserve history of a rise in sea level
Sovereign Union

Ancient knowledge is lost when a species disappears. It's time to let Indigenous people care for their country their way ***(Teagan Goolmeer, Bradley J. Moggridge, Stephen Van Leeuwen, The Conversation: 25 Jan 2022)***

Credit: Nicolas Rakotopare/Karajarri Traditional Lands Association

Indigenous people across Australia place tremendous cultural and customary value on many species and ecological communities. The very presence of a plant or animal species can trigger an Indigenous person to recall and share knowledge. This is crucial to maintaining culture and managing Country. But as species disappear, ancient knowledge built up over thousands of years also fades away—and fragments of our culture are lost forever. For years, Indigenous groups have pushed for the right to partner with government authorities to "co-manage" culturally significant species and communities. Such recognition of Indigenous rights would require amendments to environment and land management laws. Unfortunately, changes to Australia's federal environment laws currently underway fall short of what's needed. To protect Australia's imperilled species, the law must chart a new course that allows Indigenous groups to manage their Country, their way.

Precolonial First Nations oyster fisheries sustained millennia of intense harvests, study shows ***(Donna Lu, The Guardian: 4 May 2022)***

Prof Ian McNevin said 'the scale of Indigenous oyster harvesting is extraordinary', and compared it to contemporary commercial oyster farms. *Photograph: Orjan F Ellingvag/Corbis/Getty Images*

Oyster fisheries in Australia and North America survived for up to 10,000 years prior to colonisation, sustaining First Nations communities even under intense harvest, according to new research. The study calls for Indigenous knowledge to be incorporated into managing oyster reefs today. Oyster fisheries have declined globally in modern times: an estimated 85% of 19th-century oyster reef area has been lost in the past 200 years. An international team of researchers studied historical oyster fisheries off Australia's east coast as well as along the Pacific and Atlantic coasts of North America, and the Gulf of Mexico coast. The study, published in the journal Nature Communications, combined historical catch records with archaeological data on oyster abundance and geographical distribution of sites. In Australia, the research drew upon 16 known oyster middens in south-east Queensland – accumulations containing millions of oyster shells. Along Queensland's Great Sandy Strait, these middens are "deliberately made mounded structures as monuments on the landscape", said Prof Ian McNiven of the Monash Indigenous Studies Centre, a collaborator on the project.

You Retweeted

Corey Tutt @corey_tutt · Mar 28

Heard young Penny got bullied last week. Told she wasn't "Aboriginal" then punched by a non-Indigenous boy. I'm proud to call pen a young Deadly Scientists 👩‍🔬 she's brave embraces her culture and heritage. Stay deadly Pen hope you feel better soon.

23

You Retweeted

AssocProf Bradley Moggridge @bradmoggo · Mar 22

Indigenous knowledge of groundwater can improve the understanding of groundwater systems on the driest inhabited continent on earth for this World Water Day 2022 Making the invisible visible. #WWD2022 #UNWater @iahaustralia

6 16

Indigenous Science

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F1 giant McLaren and Daniel Ricciardo to feature Australian Indigenous charity Deadly Science on grand prix cars *(ABC Illawarra / By Justin Huntsdale and Lindsay McDougall: 5 Apr 2022)*

When Corey Tutt was told the logo for his organisation Deadly Science was going to be put on McLaren's F1 cars for this week's Australian Grand Prix, he thought someone was playing a practical joke on him. This weekend, the charity that provides science books and early reading material to remote Australian Indigenous communities will have its logo beamed around the world. Corey noted that "McLaren has also handed over their social media account with 9.1m followers to share the story of Deadly Science." It is fitting McLaren will display an Australian not-for-profit on its car because Australian Daniel Ricciardo is one of the team's two drivers. "I can't wait for the fans to see this, it's going to be awesome," Ricciardo said.

McLaren's F1 car displaying the Deadly Science logo that will be visible at this week's Melbourne Grand Prix. *(Facebook: Deadly Science)*

Charcoal from ancient campfire in Australia reveals 50,000-year-old grocer, pharmacy *(News9 Staff: 18 Mar 2022)*

Researchers in Australia have for the first time used archaeobotany to investigate the charcoal from ancient campfires, in desert rock shelters. Wattle and other acacias were found in the oldest archaeological find in the lands of the Martu people in the Western Desert. The findings showed that wattle has been used continuously for over 50,000 years, for a number of purposes so that human populations could survive in the wild, harsh environment. Chae Byrne, who led the research says, "Wattle was critical to the lives of the Martu and essential to the habitability of the arid landscape of the sandplains and rocky ridges of the Western Desert – and it still is. Then and now, wattle has been used as firewood, to make tools, as food and as medicine."

Golden wattle found in the Blue Mountains of Australia. *(Image credit: April Pethybridge/Unsplash)*

Trinity Bay State High School
May 5 at 2:00 PM ·

😱🤩 You might recall our January post about
Year 11 Tbay student, Wypaan, who is having her very own design 🎨 printed onto a #satellite 🛰️ that will be launched into #space 🚀⚪🌌 this year!

Here are some recent photos from Wypaan's visit to @griffithuniversity to see the model satellite. The actual satellite will be the size of a washing machine!

Wypaan will return again in August to finalise the project with the team.

If you missed the January post, here are the details again....

Congratulations Wypaan, who won the competition hosted by @gilmourspacetech and @griffithuniversity
whereby the winning #design will be printed onto a satellite that will be #launched into space in 2022.

Wypaan is an enthusiastic #visualarts student and member of the @csirogram / @csiro 's #youngindigenousSTEMacademy.

⭕ Wypaan was interviewed on ABC Gold Coast Drive yesterday with Cath Border. You can hear the replay here: https://www.abc.net.au/.../programs/drive/drive/13703722 ✅ (from the 1:44:42 minute mark).

Read the article here; https://ww

@Australianspaceagency
#tbay2022 #trinitybayshs #tbay

Torres Strait graduate bridging marine science and islander traditions

(Teisha Cloos, National Indigenous Times: 9 Mar 2022)

Marine Biologist Madeina David is using her degree to connect modern science with traditional land and sea management on her island home of Iama (Yam) in the Torres Strait. The 23-year-old marine biology graduate undertook a cadetship with the Torres Strait Regional Authority and later joined the TSRA Land and Sea Management Unit, where she is currently putting her skills to work. "My parents are very proud and happy to have me home, it doesn't feel like a job or work, I'm doing things that I love," she said. Ms David said she has always wanted to work in the marine biology field. "Even before starting primary school, I knew I wanted to be a marine biologist," she said. "My dad is a cray fisherman and growing up I was always out on the reef with him, I love it. "I want to ensure future generations can experience the sea and all that it provides."

Sharing Indigenous knowledge about the determinants of planetary health

(Jade Bradford, Croakey Health Media: March 16, 2022)

Using Indigenous perspectives from around the world, new research has defined ten determinants of planetary health, while calling for western science to embrace Indigenous knowledge. The research, 'The determinants of planetary health: an Indigenous consensus perspective', was undertaken by a group of Indigenous scholars, practitioners, Elders, knowledge-holders and land and water advocates who came together to answer the research question: "What are the determinants of planetary health?" The group includes scholars from the United States, Canada, Germany, Kenya, Bolivia and El Salvador. First Nations contributors from Australia include Dr Clinton Schultz, a Gamilaroi man and psychologist, Marlikka Perdrisat, a Nyikina Warrwa and Wangkumara Barkindji researcher, and Professor Anne Poelina, a Nyikina Warrwa Traditional Custodian. Their research findings group the interconnected determinants under three levels: Mother Earth level, an interconnecting level, and an Indigenous Peoples' level.

Reflecting on the planetary determinants of health. *Photo by Margot Richard on Unsplash*

Quarries, trade and Dark Emu: unearthing treasures from 'Australia's Silk Road'

(Donna Lu, The Guardian: 15 Mar 2022)

In 2017, the Indigenous elder George Gorringe led a small research expedition in the Channel Country of south-west Queensland. The expedition, on the traditional land of the Mithaka people, visited several sites including sandstone quarries, stone arrangements, and the remains of gunyahs – dwellings made from excavated structures covered with branches. The region is archaeologically significant: the landscape has been dramatically altered by a huge network of quarries, which Mithaka people once used to make seed-grinding implements. "George Gorringe showed me some really monumental sites," recalls Dr Michael Westaway of the University of Queensland. "The scale of them is just mind-blowing."

A team involving traditional owners and researchers eventually identified 179 quarry sites, spread over 33,800 sq km – an area about half the size of Tasmania. Some quarry pits are estimated to be more than 2,000 years old. In December, Westaway and collaborators received grant funding to investigate plant domestication and possible village sites on Mithaka land. The research seeks to determine how best to "define traditional Aboriginal food production and settlement systems". The project, Westaway says, will test the Dark Emu hypothesis: the idea, propounded by Bruce Pascoe in his bestselling book, that Indigenous people in pre-colonial Australia were not hunter-gatherers, but practised agriculture.

Researchers excavate a gunyah – a traditional dwelling – on the traditional land of the Mithaka people in Queensland's Channel Country. *Photograph: Michael Westaway*

Early Australians lived in stone houses 9,000 years ago

(Hannah Osborne, International Business Times: 5 Sept 2016)

Last year some of the contentions about permanent settlements in south-eastern Australia made by Bruce Pascoe in his seminal book "Dark Emu" were criticised. We revisit this article from 2016 which demonstrates that permanent dwellings were not just a feature of the cool and temperate country in southern Australia, but also existed in the hot dry desert country of north western Australia.

Evidence of stone houses dating back 9,000 years has been discovered on the Dampier Archipelago in Australia. A team of archaeologists found a huge rock shelter that was built between 8,000 and 9,000 years ago, along with artefacts indicating occupation of the area for far longer – as much as 21,000 years. Dampier Archipelago is in the north west of Western Australia. Experts are currently working to have it designated as a world heritage site, having formed around 7,000 years ago when rising sea levels flooded the coastal plains. Before and during the last ice age, the coast would have been located 160km further out, making it a good spot for human occupation.

Jo McDonald, from the University of Western Australia, led the team that discovered the settlement. "Our works managed to find a rock shelter on the Dampier Archipelago which we've dated to during and before the last ice age, which is something we haven't managed to find on the Dampier Archipelago before," she said. The rock settlement itself is described as "huge", spanning up to 30m on the surface. "Excavations ... have uncovered evidence of one of the earliest known domestic structures in Australia, dated between 8000 and 9000 years ago," McDonald said. "This is an astounding find and has not only enormous scientific significance but will be of great benefit to Aboriginal communities in the area, enhancing their connections to their deep past and cultural heritage."

A stone settlement discovered on Dampier Archipelago
University of Western Australia

Seven stories about Indigenous science [from Australia] **from 2021**

(Cosmos: 26 Jan 2022)

Want to learn something new about Indigenous science? Here at Cosmos, we've rounded up some of our best stories about Indigenous science and scientists from 2021.

A team of Martu rangers sighted the rare night parrot in August 2021. *Credit: Kanyirninpa Jukurrpa.*

1. **Cosmos Q&A: Caring for country**

With the climate crisis and its impacts continuing to worsen, Australia needs to respect and draw on Indigenous knowledge and practices to heal country, says Wiradjuri physical geographer Michael-Shawn Fletcher. Learn more about how Fletcher's interdisciplinary research is reaching back into the deep time of the continent.

2. **A long lesson for better land use**

Bruce Pascoe brought Aboriginal agriculture and food plants to a much wider audience with his book Dark Emu. The next step was to ensure that the Indigenous food renaissance is driven by, and benefits, Aboriginal people – which is exactly what Pascoe's farm, Black Duck, is setting out to do.

3. **How to use drones responsibly in Kakadu**

Drones are hugely useful for conservation and biodiversity monitoring -– but at the same time, can pose cultural risks and concerns for traditional owners. A collaboration between researchers, Jawoyn traditional owners and Indigenous rangers produced Indigenous-led guidelines for responsible drone use in Kakadu National Park.

4. [Lunar traditions of the First Australians]

Learn from Gamilaraay astrophysicist Karlie Alinta Noon and astronomer Duane Hamacher about how Aboriginal and Torres Strait Islander peoples use traditional knowledge of the Moon to guide weather predictions, food acquisition, and ceremonies. This article first appeared in Cosmos issue 90.

5. [Water policy in Australia]

Water is precious, especially on a dry continent like Australia. In this Cosmos Briefing, Kamilaroi water science researcher Bradley Moggridge joins other water management experts Erin O'Donnell and Warwick Ragg to discuss the future policies needed to maintain safe and equitable access to water.

6. [Night parrot sighting]

In August 2021, a group of Martu rangers working on country in northern Western Australia caught an exciting glimpse of an endangered night parrot – joining an exclusive group of fewer than 30 people thought to have seen the bird alive.

7. [Nature, food and kinship]

Most people know that Australia is home to many unique species and ecologies, but fewer of us have thought about how this uniqueness shapes traditional nutrition and other plant uses among Indigenous peoples. In this Cosmos Briefing, Bruce Pascoe joins Indigenous people from around South Australia to share knowledge of how nature, food and kinship intersect in Aboriginal cultures.

New aquaculture centre next step for World Heritage-listed Budj Bim

(Matt Neal, ABC South West Vic: 2 Apr 2022)

There are still a few finishing touches to be made, but the official opening of the Tae Rak Aquaculture Centre at Budj Bim in south-west Victoria is another important milestone for local Indigenous people. The building sits near Tae Rak (Lake Condah), which is home to an elaborate aquaculture system of eel traps that are older than the pyramids. The aquaculture centre will house Indigenous artefacts, visitor facilities and an eel tank, as well as a kitchen serving up the bush tucker of the region, including eels. The site received its heritage listing in 2019, but the pandemic and a lack of suitable infrastructure limited the chances for the traditional owners to welcome visitors to country.

The aquaculture centre near the World Heritage-listed eel traps at Budj Bim will open later this year. *(ABC South West Vic: Matt Neal).*

Captains of industry: Australia's ancient seafaring trade rewrites history

(Mike Foley, The SMH: 30 Jan 2022)

Groundbreaking archaeological research has confirmed scientifically what Indigenous peoples already knew, that first Australians were making huge overseas voyages to trade in a vast international network at least three millennia earlier than previously thought. The common perception is that Australia's culture evolved like its flora and fauna, in profound isolation across a deep history until Europeans arrived. The archaeological record now shows as far back as 3000 years ago or more people from mainland Australia were building ocean-going double outrigger canoes up to 20 metres long and loading them up with crew and valuable goods and sailing thousands of kilometres to trade in distant lands.

Walmbaar Aboriginal Corporation director Kenneth McLean, a Dingaal Traditional Owner of Jiigurru, or Lizard Island, 33 kilometres off the Queensland coast says the discovery of artefacts that demonstrate the far-flung trade links of people from Cape York may enable his people to share a story they already knew with world. "Our elders passed knowledge down through generations for us, teaching us how the old people were living back in the day, way before Captain Cook ever came," McLean says. "Hopefully we can educate Australians and the people around the world on how old our country is, and how old the international trade is."

"You can literally hold a piece of pottery when we're doing excavations on Lizard Island and pull it out from a metre underground, a piece the size of your thumbnail, and you say: everything changes after this," Professor McNiven says. *CREDIT: SEAN ULM*

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a) Pasifika

Project Hokulani

(University of Hawai'i at Mānoa: Mar 2022)

Welcome to Project Hōkūlani

The overarching goal of Project Hōkūlani is to support Native Hawaiian high school students to enter into postsecondary science, technology, engineering, and math (STEM) fields through a culturally responsive, strength- and work-based enrichment program.

What We Do

Serve Native Hawaiian youth and their families throughout Hawai'i, including the islands of Hawai'i, Kaua'i Lāna'i, Moloka'i, and O'ahu. High School Students: Throughout the academic year, we provide bi-monthly student sessions focused on science exploration within Native Hawaiian culture and hands-on activities; college preparation and dual credit opportunities; paid internships; and mentoring. 'Ohana: Throughout the academic year, we provide monthly 'ohana gatherings that prepare high school parents and families with college tips and resources; strategies to help children learn science at home; and other culture-based science activities. For more information, please email us at projecth@hawaii.edu

New whale species to be named after Mātauranga Māori whale expert

(UNSW: 15 Nov 2021)

Whales are often named after Western scientists and after men, but that tradition is about to change, as a newly discovered species of whale will carry an Indigenous name and the name of a woman. Its scientific name will be Mesoplodon eueu, referring to its Indigenous roots in South Africa, and its common name Ramari's beaked whale after Ramari Stewart, a Mātauranga Māori whale expert. Until now, this beaked whale was thought to be the True's beaked whale but almost a decade ago, a female washed ashore on the west coast of Te Waipounamu (South Island), Aotearoa New Zealand. She was 5 meters long and pregnant. The local iwi (tribe) of Ngāti Māhaki named her Nihongore and her bones were sent to Te Papa Tongarewa Museum in Wellington-New Zealand for preservation. "When Nihongore turned up I knew that she was something different, I knew it was special because I hadn't seen it before," – Ramari Stewart. The discovery was made by Ramari Stewart, a renowned Tohunga Tohorā (whale expert) who was raised by her elders in the traditional Māori knowledge of the moana (sea). Together with biologist Dr Emma Carroll from the University of Auckland – Waipapa Taumata Rau, they would bring the world of Mātauranga Māori and science together to explore the nature and origins of this whale.

These women are combining Indigenous knowledge and science to save coral reefs

(Doloresz Katanich, Euronews Green: 7 Feb 2022)

A group of Indigenous women is being trained to safeguard coral reefs under threat from climate change. "The Sea Women of Melanesia is a team of women from Melanesia, who are passionate about marine conservation and who are willing to go back to their community to set up marine reserves, " says one of the team leaders Naomi Longa. Since 2017, the NGO has been working hand in hand with local communities on marine conservation in the Solomon Islands and in Papua New Guinea.

The programme recently won the UNEP's Champions of the Earth prize in the Inspiration and Action category. Sea Women of Melanesia trains local women in essential skills including marine science, snorkelling and underwater photography. They then help monitor and assess the impacts of widespread coral bleaching on some of the world's most endangered reefs. And local communities have their knowledge to share too which, when combined with the science, helps protect the reefs. "Most of the women have no background in science, they have their local way of dealing with conservation, " says Apelis. "They take ownership of the sea. So we just go in, and we learn from them, and also impart the scientific knowledge to them."

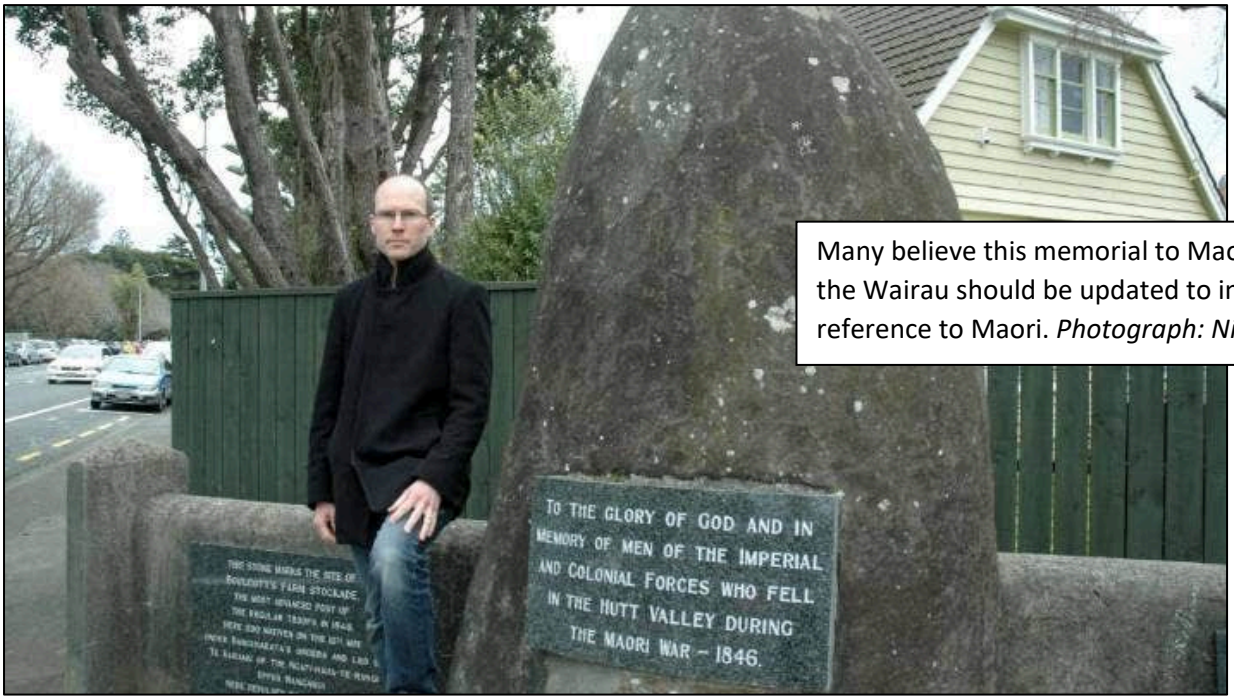
The Bulletin of the Indigenous Science Network is distributed four times a year via email directly to members. Membership is open to all. If interested in being a part of the Network, please contact the Coordinator via email at IndigenousSciNet@yahoo.com. Issues distributed in February, May, August and November each year.

The importance of engaging difficult knowledge in schools

(Liana MacDonald (Ngāti Kuia, Rangitāne o Wairau, Ngāti Koata), Victoria University of Wellington, Ipu Kererū - Blog of the New Zealand Association for Research in Education: 15 Mar 2022) **Link**

Difficult knowledge about the past can compel individuals to recognise how they belong or feel at home in the nation state, and induce strong emotions like discomfort, anger and shame. In this article, I discuss how mainstream New Zealand society resists difficult knowledge both at sites of historical colonial violence and through mundane interactions between teachers. I draw parallels between these two seemingly different contexts to reiterate that national institutions covertly normalise a sense of settler belonging.

My research last year led me back home to Blenheim to observe how my cousin and Māori historian, Peter Meihana, approached the teaching of local history at sites of significance to mana whenua in the Wairau. The large class of 14-15 year old girls were significantly affected by kōrero about the Wairau Affray conflict, but seemingly more so by the story of the Wairau Reserves. I remember a heavy silence falling over the girls as Pete described how Ngāti Toa, Ngāti Rārua and Rangitāne o Wairau were pushed onto parcels of land at the bottom of a valley, far smaller than what was promised by the government. The area became overpopulated quickly and was made inhospitable because settler farmers diverted waterways to make their farms more productive. The effect of land deals between iwi and the government, the flooding, and sickness and disease that followed, continue to negatively impact Māori in the Wairau today.



Many believe this memorial to Maori War in the Wairau should be updated to include reference to Maori. *Photograph: Nicholas*

The adults who attended the field trips were as interested as the girls learning about these difficult and silenced histories. And while it seems that most of the wider New Zealand society does not want a legacy of historical and political ignorance about Aotearoa histories to continue, to what extent are the Ministry of Education and the teaching community prepared to counter and redress the implications of silencing in our primary and secondary schools?

Getting to grips with Aotearoa New Zealand history will also give many Māori, particularly those who were not raised tūturu, answers to deeply held personal questions about who they are and how they belong in our society. I should know, I was one of them. However, breaking the silencing of difficult histories directly challenges the ideologies that underpin celebrated notions of being a Kiwi, and the symbols and daily practices that reinforce the idea of an equitable and harmonious bicultural society.

The ocean that binds us: How indigenous collaboration is helping to protect the moana

(Te Kuru o te Marama Dewes, The Spinoff: 28 Apr 2022)

Te Aomihia Walker, a marine biology graduate and policy analyst with Te Ohu Kaimoana, has spent six months in Iceland researching how indigenous knowledge can improve the health of our overfished oceans. For years, commercial fisheries have dominated the management of our ocean bodies. Now, a tenth of fish stocks globally are on the brink of collapse. This comes from a report by The Minderoo Foundation (a philanthropic organisation backed by Australian billionaire Andrew Forrest) released in 2021. It found nearly half of fish stocks assessed had been depleted to less than 40% of their pre-fishing population. And, a tenth of fish stocks are on the brink of collapse. The report identifies rising sea temperatures, ocean acidification and overfishing as the driving factors for this depletion. In the face of this existential threat to our moana, there is a growing political awareness of the need to consider more holistic models of fisheries and oceanic management.

Te Aomihia Walker in Iceland *(Photo: Supplied; additional design by Tina Tiller)*

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b) Asia

ELEVENTH HOUR: Traditional knowledge is a common thread that runs through climate action and resilience building *(Ronald R. Maliao, Manila Bulletin: 24 Feb 2022)*

Post-event photo of Team Bintuwak with local artisans, multi-stakeholders and newly founded Kinaiya it Kailayahan Climate Advocates of Nabaoy (KKCAN) during the conduct of Bugae Kinaiya: A Cultural Show of Nabaoynons (for developing local climate change resilience). *PHOTO: Supplied*

Empowering local communities starts with appreciating and valuing their indigenous knowledge, systems, and practices (IKSP) to get them involved and to collaborate. Through the campaign "Kinaiya it Kailayahan: The Role of Indigenous Knowledge Systems and Practices of Nabaoynons in Malay, Aklan in Developing Local Climate Change Resiliency," a team of environmental advocates and marine biology researchers called Team Bintuwak seeks to enhance the understanding and appreciation of the public on the importance of IKSP in riverine conservation.

Team Bintuwak believes that integrating IKSP into a knowledge pool for ecosystem management and restoration activities is a promising approach to freshwater riverine conservation, climate change adaptation, and the development of better coping mechanisms for climate-induced stresses. Local communities are already exposed and burdened by the costs of climate change impacts. Data shows that there exists a long record of climate change adaptation actions practiced by locals and that the dangers of climate change are already threatening traditional knowledge.

Traditional Indigenous Agriculture may be Key to Sustainability in India *(Andrew Wight, Forbes, 3 Apr 2022)*

Joli Rumi Borah at Pacific Spirit Park, Vancouver, British Columbia, Canada in 2021. JAN SAGANOWSKI

Conservation scientist Joli Rumi Borah found that a traditional indigenous farming method from India that feeds millions of people in the Global South has carbon and biodiversity and cultural benefits as well. Borah, currently a postdoctoral research fellow at University of British Columbia, Vancouver, Canada, says carbon stocks and biodiversity recovered where shifting cultivation, called jhum by the indigenous Naga people, was found in Nagaland, Northeast India. "My research showed that farmers in Northeast India have adopted various innovative ways to improve crop yield and enhance forest regeneration," she says, adding that this was evident in the high levels of carbon stocks and bird diversity in the jhum cultivation landscapes in Nagaland.

c) Africa

Speak Mother-Tongue, Save Indigenous Culture

(Editorial, Daily Trust, Lagos NIGERIA: 2 Feb 2022)

Besides globalization with its impactful tools on indigenous cultures, the apathy for mother tongue by some native speakers is another attitudinal threat confronting indigenous languages and cultures in Nigeria. When people abandon their native languages in favour of a foreign one, they end up moving away from their indigenous culture. Language is the natural custodian and preserver of the historical, literary and intellectual treasures of indigenous culture. The elitist penchant for everything 'West' to the detriment of mother-tongue is a huge dis-service that short-changes indigenous culture; and a faster means to killing native languages. It is ridiculous that English has been adopted to take the place of mother tongue in some Nigerian homes; leaving children in such homes without a native language. When a language dies, opportunities, traditions and unique modes of expression are also lost. Lack of enough teachers to teach Nigerian languages in schools is one critical challenge facing the teaching of indigenous languages in the country. These inadequacies seek to frustrate the application of the principle advanced by Nigeria's former Minister of Education, Professor Babs Fafunwa, that children learn science and mathematics faster when taught in their mother tongue.

UN takes note of global indigenous fire practices to control wildfires

(Chris Baraniuk, Hakai Magazine: 17 January 2022)

Maasai warriors trying to light a fire in Tanzania. *Photo: iStock*

The United Nations has taken note of burning practices and techniques of indigenous peoples around the world as a method to control wildfire incidents in a recent report on increasing incidences of fires globally. “Support and integrate Indigenous, traditional, and contemporary fire management practices into policy” is one of the recommendations of the report titled Spreading like wildfire: The rising threat of extraordinary landscape fires. The report was released by the United Nations Environment Programme recently. The report noted that “indigenous and traditional knowledge of land management in many regions — particularly the use of fire to manage fuel, including for wildfire mitigation — can be an effective way of reducing hazard. “It can also ensure that biodiversity and cultural (including understanding traditional gender roles that can govern burning activities) and ecological values are respected, as well as create livelihood opportunities,” it said.

Discussions under way for more school subjects to be written in indigenous languages: Motshekga *(Rhythm Rathi · CBC News · Mar 25, 2022)*

Basic Education Minister Angie Motshekga says discussions are under way to have more school subjects to be written in indigenous languages. She believes that learners understand the education system far better when taught in their own home language. Motshekga was delivering the keynote address on the second day of the International Mother Language Day seminar in East London in the Eastern Cape. She applauded the Eastern Cape for taking the lead in such an important development. “It really has been very helpful that the Eastern Cape took the lead and you can see it took almost ten years to get to where we are so in a sector that is as big and as complicated as us, we need a very systematic long term transformation program for you to have the confidence to drive the change process. “Once we get consensus and agreement then we authorise and agree on that terminology so we have gone through that process already for mathematics and science,” says Acting CEO for PANSALB Xolisa Tshongolo.

Indigenous Science Network @IndigenousScie1 · 30s

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The Benin Kingdom, dating back to the 11th century, was one of the oldest and most advanced states in western Africa. Benin's walls with ...


TOMB NO.17 OF PRINCE KHETI 2000 B.C.
AT BENI-HAMAN EL MINIA - EGYPT
If people realized who really invented most of the things we use today, people would probably have more respect for Africans.
MR IMHOTEP

d) Americas

How Indigenous burning shaped the Klamath's forests for a millennia

(University of California – Berkeley, Science Daily: 15 Mar 2022) Link

A new study combines scientific data with Indigenous oral histories and ecological knowledge to show how the cultural burning practices of the Native people of the Klamath Mountains -- the Karuk and the Yurok tribes -- helped shape the region's forests for at least a millennia prior to European colonization. The study found that forest biomass in the region used to be approximately half of what it is now, and that cultural burning by the tribes played a significant role in maintaining the forest structure and biodiversity, even during periods of climate variability. For example, while there were probably fewer lightning-sparked fires during the cool, wet time period known as the Little Ice Age, data from the study suggests that burning in the region actually increased during that time, and that forest biomass remained relatively low.

How one Canadian scientist is tapping into the knowledge of Indigenous communities

(Brian Owens, Nature: 21 April 2019)

Jean Polfus, a postdoctoral fellow at Trent University in Peterborough, Canada, studies the distribution and spatial organization of caribou (or reindeer; Rangifer tarandus) populations in the Sahtú region of the Northwest Territories. She explains how she collaborates with members of the Dene Indigenous community, and how their insights benefit her research:

Why was it important to you to work with Indigenous communities?

In 2012, the local community-run institutions responsible for resources such as fish, wildlife and forests got together and drafted a resolution asking that Dene traditional knowledge, laws, traditions and language be respected and represented in any caribou research going forward. I adapted my work in response to this community initiative and developed memoranda of understanding with the communities to dictate how that should be done — the research questions to pursue and the methods that local people considered appropriate to carry out research. I developed a way to do caribou research that respected local people and included them in all phases of the research process.

What did you learn from the Indigenous communities?

Dene people have such nuanced language to describe caribou. They have words for types of caribou that we don’t identify in conventional classification and taxonomies. For example, there’s the Tęnatł'əa which is a type of mountain caribou with unique markings and behaviour. This word wouldn’t exist in their language if it wasn’t essential to understanding the caribou and how to hunt them effectively. Tęnatł'əa warrant further study because they might harbour unique genetic diversity and could play an important part in caribou population dynamics.

Connections between natural phenomena and Indigenous scientific knowledge

(CBC Listen: 25 Mar 2022)

The Early Edition with Stephen Quinn

Connections between natural phenomena and Indigenous scientific knowledge

Play Segment 9:07 Share Segment

A UBC professor is investigating connections between natural phenomena and Indigenous scientific knowledge. We learn more about Indigenous hydrology and astronomy from Shandin Pete, assistant professor of teaching in UBC's department of earth, ocean and atmospheric sciences.

Aired: March 25, 2022

In Canada, Indigenous Communities and Scientists Collaborate on Marine Research

(Moira Donovan, The Good Men Project: 16 Mar 2022)

The Apoqnmatulti'k project combines Indigenous knowledge, Western science and local knowledge holders to gather information about three important marine species in two ecosystems in Nova Scotia, Canada's easternmost mainland province. The project comes at a time of increased urgency over management of marine species, as many fish stocks are on the decline, while access to lucrative fisheries has sparked conflict. Project partners say the project's collaborative approach will provide information that could help direct stewardship and conservation of species that are important to many communities. As important as that new data is, project participants say the greatest insight of the project may be that forging the trusting relationships required for collaborative research takes time, which doesn't always correspond to standard academic deadlines.

Dr. Faisal Moola Retweeted

SpruceLab Inc. @spruce_lab · Dec 11, 2021

Meet the SpruceLab team!🙂🌲 Meet @SheilaBoudreau, SpruceLab's Founder and Principal. She shares how SLs approach to #NatureBasedSolutions prioritizes Indigenous voices and incorporates the wisdom of nature to create places for the future.

#EngagingDesign

1 3

Land Needs Guardians @land_guardians · Apr 29

A new licensing process for researchers visiting Łíídlıı̨ Kų́ę́ First Nation will be the first of its kind in NWT, bridging #Indigenous & Western science by giving the Nation control over research done on their lands, & rights to the data produced.

cabinradio.ca

Seeking data sovereignty, a First Nation introduces its own licence

In what could be a precedent-setting move, an NWT community is changing its approach to scientific licensing with a view to regaining ...

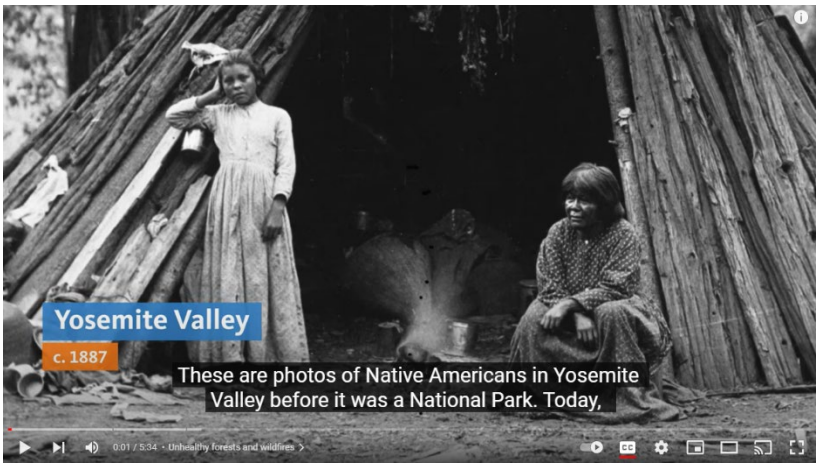
7 18

Up close with the data, and work, of Indigenous guardians along B.C.'s Central Coast

(Arik Ligeti, The Narwhal: March 23, 2022) Link

There isn't a whole lot of federal or provincial monitoring along parts of B.C.'s thousands upon thousands of square kilometres of coast. Coastlines where people get into life-threatening boating accidents. Where poachers sneak out their crab traps. Where oil spills occur and where some of the world's most magnificent species hang out. But know who is there to see all this unfold? Indigenous guardians. And so, back in 2019, reporter Jimmy Thomson began to wonder: could we get a better sense of just how much of a monitoring and conservation gap these Indigenous land stewards are filling? Turns out we could — and it's a heck of a lot. Guardians, who are out on the land and the water on a daily basis, are patrolling massive areas along the coast. Not only that, but these individuals are saving lives, collecting data, filling conservation gaps and reinforcing their sovereignty in the process. All those details are beautifully captured in this sprawling feature we published over the weekend, a kind of visual journalism we've never done before.

To stop uncontrollable wildfires in California, look to this once-outlawed Indigenous practice *(University of California: 7 April 2022)*



Video explaining how the Native American practice of 'good fire' can help forests thrive.

Beth Rose notes that there is work underway in Yosemite to re-introduce cultural burning to the park (under the oaks in the Valley). It's led in part by Irene Vasquez, a National Park Service cultural ecologist and member of the Southern Sierra Miwuk and Paiute tribes.

Wolf research braids GPS, helicopters with Indigenous knowledge systems

(Warren Schlote · CBC News: Mar 28, 2022)

A study on eastern wolves near Georgian Bay is taking a unique approach by braiding western scientific techniques together with Indigenous knowledge systems. Wiikwemkoong's species at risk co-ordinator Theodore Flamand said he's been hoping to organize a project like this for four years. He's partnered with nearby communities, researcher Jesse Popp, who has roots in Wiikwemkoong, and the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMRNF). For MNDMNRF research scientist Joe Northrup, who is also working on the eastern wolf project, embracing Indigenous perspectives has been "transformative" for how he thinks about his own work. "I see the main benefit really in just allowing a more fulsome and complete picture to be developed," he said, "and then, ultimately, to make better decisions about conserving ecosystems and species." Northrup said Indigenous practices have become more common within the Ontario government's research in the past few years, "which I think overall is a good thing." He said he hoped projects like this would encourage younger Indigenous people to pursue sciences and incorporate traditional knowledge within their practices. "It doesn't have to just be, oh, if you become a scientist, you have to give up … your Indigenous knowledge systems. The two can be used reciprocally," he said.

Researcher Jesse Popp, left, is working on the wolf project with Wiikwemkoong species at risk co-ordinator Theodore Flamand, right, and also with Ontario government research scientists. *(Submitted by Jesse Popp)*

Shade, who is now a medical student at the University of Calgary in Alberta, says she hopes her involvement in Prairies to Pharmacy can help to lay the groundwork for other young Indigenous researchers to participate in similar collaborative work, and help to inform a framework for how to use both traditional knowledge and Western science to advance discovery of the natural world. These kinds of collaborations and partnerships, once relatively rare in the natural sciences in Canada, are now actively encouraged by government funding agencies. “We’re in a cultural revolution in terms of our relationship with the First Nations communities in Canada,” says Roy Golsteyn (biochemist and director of Lethbridge University’s Cancer Cell Laboratory and Natural Product Laboratory).

Indigenous Science with Jessica Hernandez

(Adam Conover, Earwolf: 15 Feb 2022)

What would our world look like if we paid more attention to the knowledge indigenous communities have discovered about the world around us? On the show this week is indigenous environmental scientist Jessica Hernandez. You can check out her book, Fresh Banana Leaves: Healing Indigenous Landscapes through Indigenous Science, at https://bookshop.org/lists/factually.

You Retweeted

Lakota Man
@LakotaMan1

Celebrating Kelkiyana (Navajo Nation) — for becoming a permanent Grand Canyon National Park Ranger. She's awesome — wouldn't you agree?

12:24 PM · Feb 26, 2022 from Los Angeles, CA · Twitter for iPhone

BigDaddyLipscomb2 @Observer373162 · Feb 26
Replying to @LakotaMan1
Doesn't it only make sense that Native Americans would naturally make the best park rangers? Who knows the lay of the land in America better than Native Americans?

15 14 123

Paul is Living Whiskey Tango Foxtrot @Paul_ProjectIPA · Feb 26
Replying to @LakotaMan1 and @QuancyClayborne
Congratulations Kelkiyana, I am sure you are the best person for the job. You bring pride to the Navajo Nation and to the rest of us.

2 5 13

Black scientists, community leaders want Black youth 'to see possibility' in STEM
(Jessica Wong · CBC News: Feb 20, 2022)

After Juliet Daniel delivered her first lecture as a professor at McMaster University back in 1999, a few Black students enthusiastically dashed up to speak with her. However, what they said surprised the biologist and cancer researcher. "They were excited because they had never in their entire life had a single Black teacher," Daniel, who is based in Hamilton, Ont., recalled. "[They] had grown up in the GTA and they were in second-year university and I was the first Black teacher they had ever had." That experience helped drive the research scientist's decision to mentor and support young Black students, especially those studying in STEM fields (science, technology, engineering and mathematics) like hers. Black students and faculty have long seen fewer Black youth pursue and continue in STEM than other racial groups. Only in recent years has there been more support for a concerted, national effort to figuring out why. In the meantime, Black researchers, students and community groups are tackling the disparity on multiple fronts.

How Indigenous insight inspires sustainable science

(Nataly Allasi Canales, Wellcome Collection: 31 March 2022)

The traditional knowledge and cultural expressions of Indigenous peoples manifest their interactions with the environment. These include the skills they developed to solve particular problems and the ways they perceive and live life (cosmovisión), always connected to their land. This knowledge can be used in ecology, rituals, songs, stories, agriculture, hunting and, of course, medicine. Traditional medicine is the accumulated theoretical understanding, skills and empirical evidence that are transmitted from generation to generation. According to the World Health Organization, up to 80 per cent of the populations of developing countries rely on traditional medicine as their first source of medicine. For example, we might not think too much of aspirin, but its natural source (salicylic acid) can be found and extracted from meadowsweet (Spirea ulmaria). In fact, it passed clinical trials and was 'only' patented in 1900, but Hippocrates (460–377 BCE) reported the analgesic effects of the derivatives of salicylic acid found in the bark and leaves of this plant.

Geographical Names Board of Canada Appoints a New Indigenous Advisor and Celebrates Its 125th Anniversary ***(Natural Resources Canada, CISION: 2 March 2022)*** [Link]

OTTAWA, ON, March 2, 2022 /CNW/ - The Honourable Jonathan Wilkinson, Minister of Natural Resources, announced yesterday the appointment of a new Indigenous Advisor to the Geographical Names Board of Canada as the Board celebrates its 125th anniversary. Originally established in 1897, the Geographical Names Board of Canada (GNBC) serves as the national coordinating body responsible for official place names across Canada. For 125 years, geographical names have recorded and embedded a wealth of cultural and historical information about the people who inhabit or settled in a place or region. Place names are critical to safety and navigation as well as cultural heritage. More specifically, recognizing Indigenous place names contributes to preserving and revitalizing Indigenous cultures, histories and languages and plays a vital role toward advancing reconciliation. As a member of Swan River First Nation, Rob Houle of Kamloops, British Columbia, has been appointed as the new First Nations Indigenous Advisor to the GNBC for a two-year term ending in March 2024.

More than 600 geographic sites across the US will be renamed, replacing a derogatory term for Indigenous women used for decades *(Sara Smart, CNN: 27 Feb 2022)*

US Interior Secretary Deb Haaland is pictured here at the 2021 Tribal Nations Summit in November 2021. *CNN*

The Department of the Interior is moving forward with removing and replacing a derogatory term for Indigenous women used for decades across the US, the department said Tuesday. Interior Secretary Deb Haaland issued an order declaring "squaw" derogatory in November. The term has historically been used as an offensive ethnic, racial and sexist slur towards Indigenous women, the department said in a news release at the time. Haaland, who is the first Native American to serve as a cabinet secretary, established a 13-member task force to rename more than 600 geographic features that contain the term through that order. "Words matter, particularly in our work to make our nation's public lands and waters accessible and welcoming to people of all backgrounds." Haaland said in Thursday's news release. "Throughout this process, broad engagement with Tribes, stakeholders and the general public will help us advance our goals of equity and inclusion."

'It is not an unchallenging ride': Métis nursing student on staying connected to culture in a university environment ***(Faculty of Nursing Staff, University of Calgary: 11 April 2022)***

It is universally acknowledged as one of the challenges for Indigenous students coming to a major centre like Calgary for university education: leaving your support system, whether on the reserve or in your very family-focused community, does not allow much opportunity to keep connected to your culture. For third-year nursing student Erin Berland who moved from Lac La Biche, north of Edmonton, (population: less than 3,000) to the University of Calgary, roughly eight times that size on the campus alone, her first year was very much an exciting, but big change for this reason. But family values and a very close relationship to her parents and grandparents, who were supportive of her attending university, helped her get to a place of comfort in Calgary and in her program.

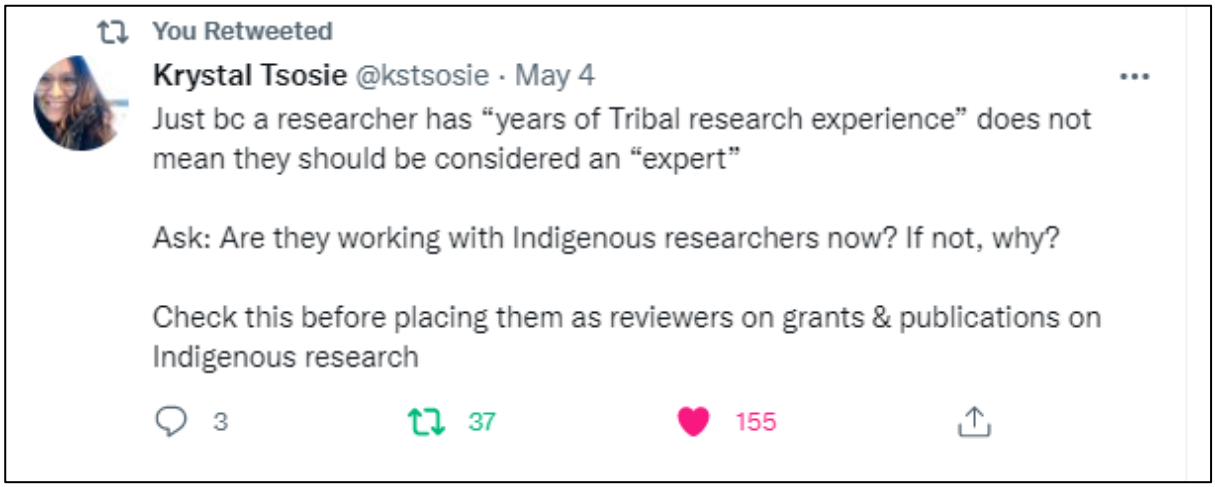
"Lac La Biche is surrounded by two Métis settlements and four First Nation's reserves," explains Berland. "Moving from my small community to Calgary was a huge change for me to get used to. I sometimes feel like I am the minority because there is a lower population of Indigenous people here compared to where I am from, but I have used it as motivation to stay connected with my culture no matter what."

Two USU Professors Helping Develop Tools to Support Indigenous Perspectives in K-12 Classrooms *(Utah State University: 22 Feb 2022)*

Melissa Tehee and Breanne Litts are part of a project developing tools to support indigenous perspectives in K-12 classrooms.

Two faculty members in the Emma Eccles Jones College of Education and Human Services are the principal investigators on a project aiming to address the lack of representation of Indigenous culture, history and stories in the classroom. Funded by a National Science Foundation grant award, this project is working to create representations of Indigenous narratives that support an Indigenous knowledge system rather than a Western knowledge system. Already in partnership with the Northwestern Band of the Shoshone Nation, they hope to expand this work in partnership with many Tribal Nations over time. Melissa Tehee is a professor in the Department of Psychology and director of the American Indian Support Project. She explained that the histories that people learn in school really impact who they develop to be, stating that "it is difficult to value things you can't see."

Teachers often feel uncomfortable teaching a culture and history they don't fully understand and that they themselves often weren't taught. Through this project, the team aims to address these pieces by making a sustainable emerging narrative technology for classrooms. They want Tribal Knowledge Holders to feel confident the technology accurately and appropriately represents their knowledge, and they want teachers to feel comfortable using this technology so that Tribal Knowledge Holders such as Parry don't have the burden of visiting hundreds of classrooms a year. For the Indigenous communities they work with, having the power to tell their own stories shapes their cultural identity and allows for healing. Further, when students in elementary school feel like they have someone in the classroom who understands their stories and perspectives, it makes a difference in how they experience the education system.



Brainstorm: ISTEAM — centering Indigenous knowledge in science education

(Jordan Mangi, The Daily Northwestern, 12 April 2022) **Link**

What does it mean to have a relationship with nature? For Indigenous kids, especially those who grew up in urban areas, this question can have complicated answers. To support these relationships and fill in what Western education might miss, researchers in Northwestern's learning sciences program — led by Professor Megan Bang, in partnership with other universities, community members and educators — are developing science learning environments for Indigenous youth and their families. Brainstorm spoke to some of the student researchers working on the project.

Black scientists won't stay in Canada without equitable research funding, experts say

(Kate Bueckert · CBC News: Feb 13, 2022)

The system for granting federal research funding in Canada fails to give Black scientists the support they need to optimize their work, professors and researchers say. Not providing that stability for researchers may result in a brain drain to other countries, says Lawrence Goodridge, who has worked in the U.S. and Canada. Goodridge holds the Leung Family Professorship in Food Safety at the University of Guelph and is director of the school's Canadian Research Institute for Food Safety. He said historical bias has negatively impacted racialized populations and women researchers in the STEMM fields — science, technology, engineering, math and medicine.

Lawrence Goodridge, director of the University of Guelph's Canadian Research Institute for Food Safety, says historical bias has negatively impacted racialized populations and women researchers in the science, technology, engineering, math and medicine (STEMM) fields. *(Submitted by Alex Tran)*

Education should include Indigenous knowledge and wisdom

(David Suzuki, David Suzuki Foundation: 31 Mar 2022)

Invaders and colonizers throughout history have regarded Indigenous Peoples and their cultures as “primitive,” paying little attention to the worthiness of their knowledge, values and beliefs. Europeans felt confident in their superiority, and were driven by “resourcism,” which viewed everything in what they saw as the “New World” as “opportunity” and “resources” to extract. In the perspective of many Indigenous Peoples, earth (soil), air (atmosphere), fire (sunlight) and water are sacred gifts, and other species are biological kin that generously allow themselves to be taken and used by people. In ceremony that persists, Indigenous Peoples celebrate and give thanks for nature’s abundance and generosity while acknowledging a responsibility to act properly so it can continue. This reciprocity includes the idea of generations — usually seven — of ancestors and those to come. Canada was not founded on this perspective, so it hasn’t been part of formal education here.

Mi'kmaw educator helps researchers incorporate traditional knowledge in the field

(Sara Smart, CNN: 27 Feb 2022)

Leah Creaser, a master's student at Acadia University, developed and taught the course at NSCC last semester. *(Submitted by Leah Creaser)*

For six weeks last fall, a small group of scientists, researchers and technicians, learned how to incorporate Mi'kmaw traditional knowledge into the work they do every day. It was part of a unique course offered at Nova Scotia Community College's nautical institute in Port Hawkesbury, and created by biologist and educator Leah Creaser from Acadia First Nation. It wasn't unusual for the three-hour, in-person classes to stretch well into four hours, as students had frank conversations about why Western science has excluded Indigenous perspectives — and what they can do to change that. These conversations don't happen enough, said Creaser, and it's why she was eager to develop a continuing education course for people who've already started their careers. "We are not the only people that were affected by colonization," she said. "In every way that non-Indigenous people believe that they can't reach out to a community, or they seem a little scared or timid around an Indigenous person … that is a product of colonization."

Guided by Elders and members of Indigenous community, nursing student writes extended land acknowledgement *(Faculty of Nursing Staff, University of Calgary: 7 Feb 2022)*

Last fall on Sept. 30, nursing student Harsimrit Lakhyan (left) was part of the Faculty of Nursing's inaugural event Honouring Truth and Reconciliation Day. That day, Lakhyan read an extended land acknowledgement she had written in her first year of the nursing program. Originally, she had offered to write it to lead her NUR 288 class for a group presentation. "I wrote this acknowledgment with the knowledge I gained from Elders and members of the Indigenous community in my term 3 placement at the Morley Community school on the Stoney Nakoda reserve," she says. During that term, Lakhyan says she learned more about land acknowledgements but always felt like something was lacking. "One day, an Elder from Morley spoke about his students, and I understood what the other land acknowledgments were missing. It was the people and what has happened and continues to happen to the people," she says.

Extended Land Acknowledgement

A common teaching of the Elders is that as human beings we did not arrive on this land on our own, but because of the knowledge of our ancestors. Such knowledge includes the coexistence of all beings of creation, who were able to — for many years — independently seek treaties to maintain the peace. I would like to take this opportunity to acknowledge the traditional territories of the people of the Treaty 7 region in Southern Alberta, which includes the Blackfoot Confederacy (comprising the Siksika, Piikani, and Kainai First Nations), as well as the Tsuut'ina First Nation, and the Stoney Nakoda (including the Chiniki,

Bearspaw, and Wesley First Nations). The City of Calgary is also home to Métis Nation of Alberta, Region 3. I would also like to note that the University of Calgary is situated on land adjacent to where the Bow River meets the Elbow River, and that the traditional Blackfoot name of this place is Moh'kins'tsis, which we now call the City of Calgary.

Furthermore, we want to extend this land acknowledgement to recognize the harm of colonization and the impact it has had and continues to have. This includes, but is not limited to, the introduction of disease, loss of traditional economic systems, loss of social connections, oppressive legislature, residential schools, and the '60s scoop which has now become the millennial scoop. The latter two have been a source for intergenerational trauma and loss of identity that many Indigenous people in Treaty 7 and across Canada continue to suffer.

We recognize the physical, mental, emotional, and sexual abuse that many Indigenous children have suffered and, in some cases, continue to suffer. We understand that this trauma is in the genes and as such we will use the seven generations back and seven generations forward approach. Furthermore, we remember each and every missing and murdered Indigenous woman as each life has left a void in the hearts and communities across this nation.

We understand that a land acknowledgement is one small step in reconciliation but is by no means the end or solution. We recognize the intersectoral collaboration needed to remove the systematic oppression that is imposed on the Indigenous people. We understand that the term Indigenous does not do justice or encompass the diversity of people to whom it is used to describe. We recognize the diversity and will work to promote it.

We, as future nurses, are aware of our role to advocate, do no harm, seek social justice, provide culturally appropriate care, and promote the health of the Indigenous people in Canada. We recognize and acknowledge the systematic oppression that exists in health care and we will strive to correct these flaws. We understand the limitations of western medicine and hope to incorporate traditional practices that benefit our patients, including but of course not limited to opportunities for individuals to smudge. We recognize the importance of collaborating with Elders in the community to provide the best care possible. We recognize that we are to honour ambiguity while supporting the patient to achieve health in the manner they choose. We recognize the importance of the seven sacred teachings in daily life and our future practice as nurses. We recognize that the ceded land agreements were done in conditions that would not be legal today and understand that we as a country have failed to meet the promises established.

Furthermore, we need to reflect on how as colonizers we have benefited from the systematic oppression of the Indigenous Peoples. Our status in Canadian society is built on trauma and oppression of Indigenous people, and we must understand this as we begin to undo the policies and remove systems that remain in place. Each of us needs to play our part to stop the othering and racist policies that separate fellow human beings from our society. We are to aid and build up our fellow Canadians in the various Indigenous communities throughout Canada. Lastly, we leave you with the question of what does this land acknowledgment mean to you? What will you do to meet the calls to action set out by the Truth and Reconciliation Commission?

You Retweeted

Rah-Sha Al-Hassan @DocRah_Peds · Mar 24

My great-grandmother only had a 3rd grade education.

My grandmother died at the age of 39 after having a massive heart attack.

My mom, as a single mother, got her Masters & PhD in my lifetime.

& today, I am a Stanford Pediatric resident.

I am my ancestors wildest dreams

6,308 32.7K 508.4K

This 23-year-old McMaster student wants to see more Indigenous perspectives included in science *(Rhythm Rathi · CBC News · Mar 25, 2022)*

Sage Hartmann, a fifth-year McMaster University science student from Red River Métis Nation in Manitoba, is out to centre Indigenous perspectives within the school's Faculty of Science, something she says there is desire for but not yet enough action on. "There seems to be a lot of desire for the integration of Indigenous [knowledge]," she said. "[But] there doesn't seem to be any Indigenous representation or folks knowing how to do so." Hartmann organized the university's World Water Day event with that in mind earlier this week, bringing a day-long program of speakers to introduce more people in the faculty and beyond to Indigenous perspectives and how they intersect with other teachings. The event was to explore "the relationship that we have to water and the land," she told CBC Hamilton.

NSF Grant Bringing Indigenous Perspectives Into K-12 Classrooms

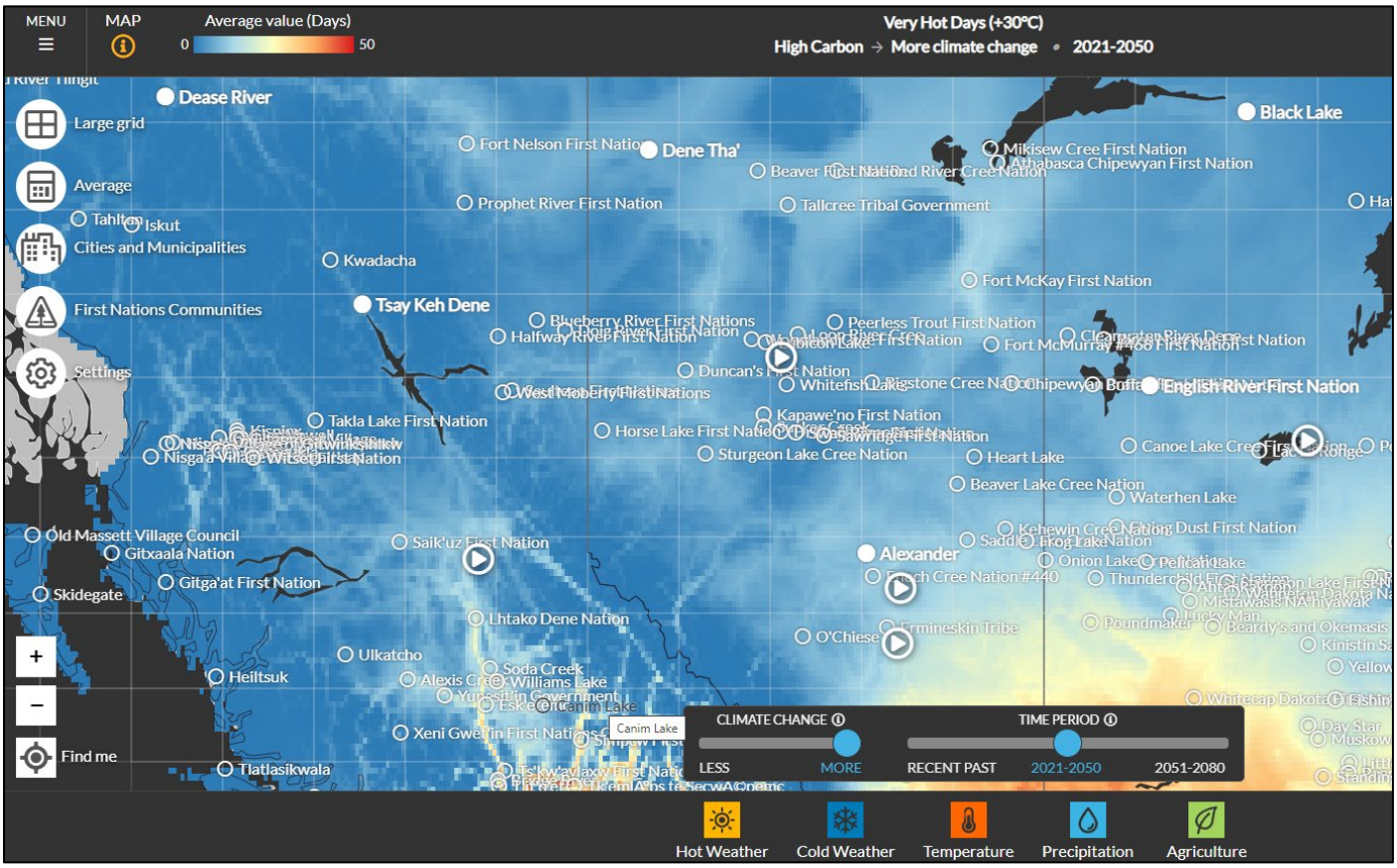
(KATE POLIT, MeriTalk: Feb 21, 2022) Link

University professors and Tribal leaders are using a grant from the National Science Foundation (NSF) to develop narrative technology tools to address the lack of representation of Indigenous culture, history, and stories in K-12 classrooms. Working on the project are two Utah State University (USU) professors, Melissa Tehee and Breanne Litts, Rogelio E. Cardona-Rivera, a professor at University of Utah, and Darren Parry, a Tribal Knowledge holder for the Northwestern Band of the Shoshone Nation (NWBSN) in Utah. Tehee, a citizen of the Cherokee Nation, is a psychologist and an expert in narrative and storytelling as a healing process with Indigenous communities. Litts is a learning scientist and has been working with the NWBSN for four years. Cardona-Rivera is a computer scientist and has extensive expertise in narrative-based computational modeling techniques. Parry is on the Tribal Council for the NWBSN and works with K-12 teachers, integrating Indigenous perspectives and American Indian history into curricula. He visits hundreds of classrooms a year across Utah and Idaho to share knowledge. The project is aimed at creating representations of Indigenous narratives that support an Indigenous knowledge system rather than a Western knowledge system. In a press release from USU, Tehee explained that the histories people learn in school really impact their personal development, stating that “it is difficult to value things you can’t see.” Tehee explained that teachers often feel uncomfortable teaching a culture and history they don’t fully understand and that they themselves often weren’t taught.

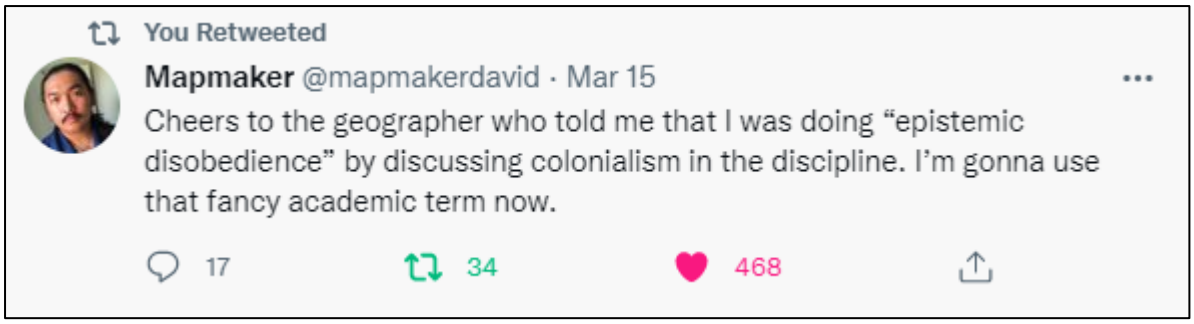
Decolonizing Canada's climate atlas through 'two-eyed seeing' *(Part 1: Colonization)*

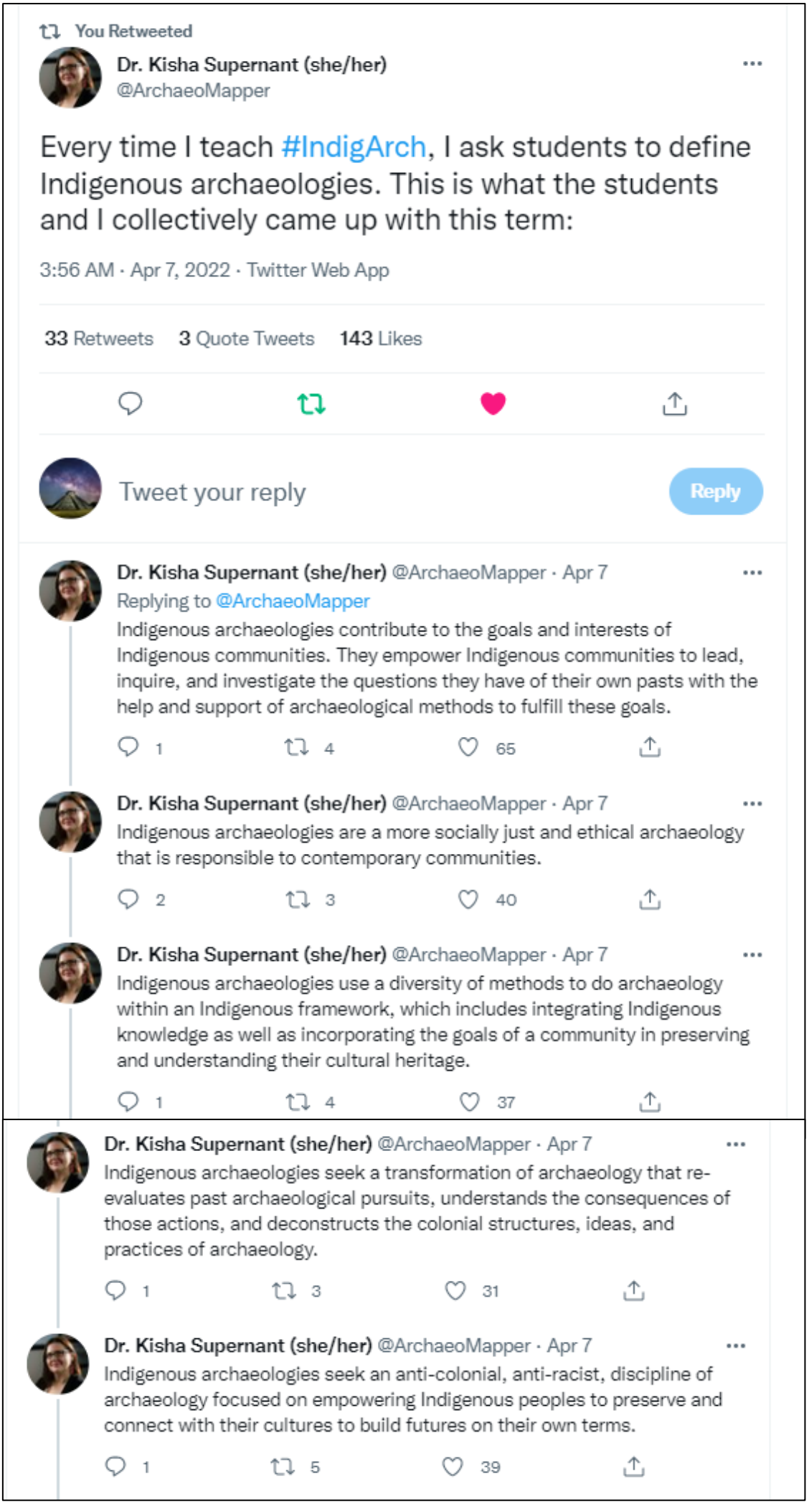
(Sharon Oosthoek, University Affairs: 4 April 2022) [Link]

Atlases are political statements – place names, borders, deciding what information to include and what to leave out. But when you create an atlas focused on climate change, and enrich it with Indigenous content, it becomes a deeply political act. That's exactly what the University of Winnipeg's Prairie Climate Centre has done, in partnership with Indigenous peoples and organizations across the country. Together, they have added Indigenous knowledges content and data to the centre's interactive Climate Atlas of Canada.



Launched on Mar. 16, the enriched atlas features videos and resources to support Indigenous peoples. That includes impacts and projections of climate change for 634 First Nations and 53 Inuit communities, plus climate adaptation and mitigation strategies across the Métis homeland. The atlas applies the principles of two-eyed seeing, said Hetxw'ms Gyetxw (also known as Brett Huson), a member of the Gitxsan Nation and research associate at the Prairie Climate Centre. "One eye is Indigenous wisdom and the other is Western science. When you do that, you can use both sides as one. We're tokenized still, and this is a way for us to be recognized – that our knowledges are important, and our perspectives are different and important."

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Dr. Kisha Supernant (she/her)
@ArchaeoMapper
Every time I teach #IndigArch, I ask students to define Indigenous archaeologies. This is what the students and I collectively came up with this term:
3:56 AM · Apr 7, 2022 · Twitter Web App
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Tweet your reply
Reply
Dr. Kisha Supernant (she/her) @ArchaeoMapper · Apr 7
Replying to @ArchaeoMapper
Indigenous archaeologies contribute to the goals and interests of Indigenous communities. They empower Indigenous communities to lead, inquire, and investigate the questions they have of their own pasts with the help and support of archaeological methods to fulfill these goals.
1 4 65
Dr. Kisha Supernant (she/her) @ArchaeoMapper · Apr 7
Indigenous archaeologies are a more socially just and ethical archaeology that is responsible to contemporary communities.
2 3 40
Dr. Kisha Supernant (she/her) @ArchaeoMapper · Apr 7
Indigenous archaeologies use a diversity of methods to do archaeology within an Indigenous framework, which includes integrating Indigenous knowledge as well as incorporating the goals of a community in preserving and understanding their cultural heritage.
1 4 37
Dr. Kisha Supernant (she/her) @ArchaeoMapper · Apr 7
Indigenous archaeologies seek a transformation of archaeology that re-evaluates past archaeological pursuits, understands the consequences of those actions, and deconstructs the colonial structures, ideas, and practices of archaeology.
1 3 31
Dr. Kisha Supernant (she/her) @ArchaeoMapper · Apr 7
Indigenous archaeologies seek an anti-colonial, anti-racist, discipline of archaeology focused on empowering Indigenous peoples to preserve and connect with their cultures to build futures on their own terms.
1 5 39

Indigenous

Indigenous and Western forest education find harmony at the Wildwood ecoforest
(Jenessa Joy Klukas, The Discourse: 24 Feb 2022) **Link**

Beau Wagner is an artist of mixed Indigenous and settler heritage, trained as a Coast Salish carver by a Stz'uminus Master. For the past years, he has offered an educational program called Cedar and Me, which enlivens the stories, cultural significance and uses of the cedar tree. Bringing that program to Wildwood ecoforest and collaborating with Western-trained educators there brought new depth to the teachings, Wagner says. Wildwood is a 77-acre forest that has been selectively harvested since 1945 with the goal of respecting the needs of plants and animals and preserving the health of the ecosystem. The Ecoforestry Institute Society (EIS) is the trustee of the Wildwood ecoforest. The society runs educational activities that teach the skills needed to understand and take care of the forest, including programs for school groups. In the last year or so, educators there have partnered with Indigenous Knowledge Keepers in an effort to blend Indigenous teachings with Western science.

Wagner says partnering with educators with different backgrounds and perspectives makes a big difference. When teaching culture to children in other settings, "they have a hard time relating to it," he says. But at Wildwood, when the Indigenous knowledge is taught next to the Western knowledge in unison, "the kids really absorb what we're talking about." "It really is walking in two worlds because [the education staff at EIS] have just a vast knowledge of the forest and the names and what to harvest, and all this knowledge is just profound. And so to be able to teach culture in that kind of a setting has so much meaning to it."

Indigenous Science

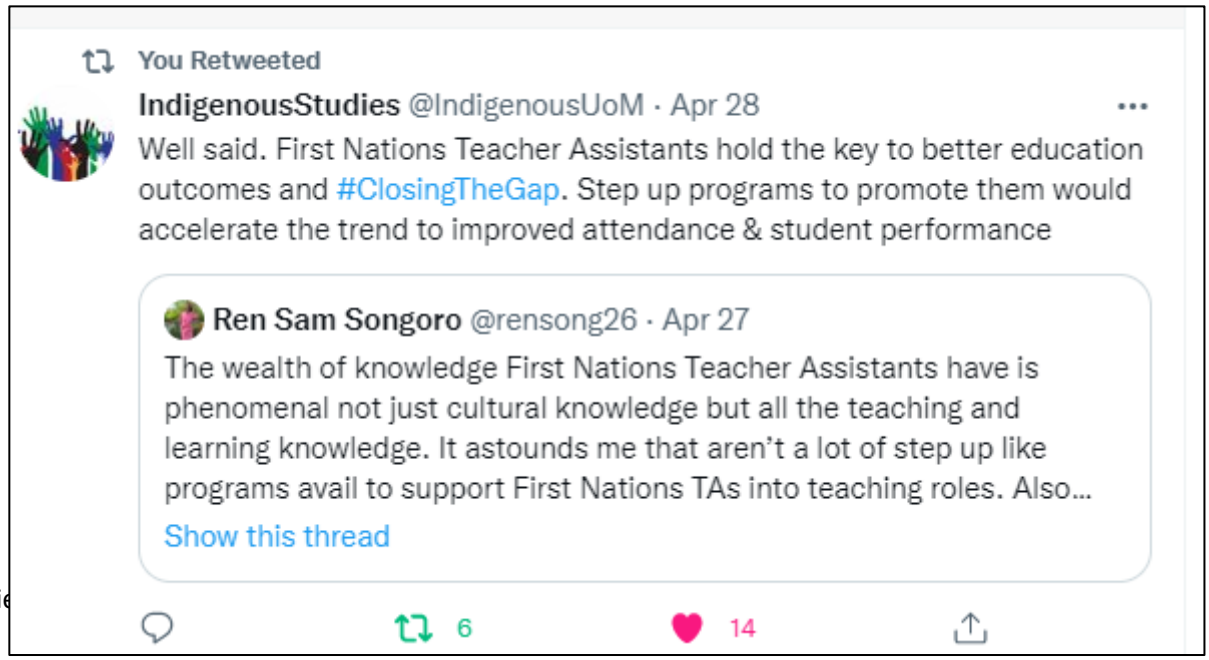
The NWMO uncovers the stories that old rocks are telling us
(Hannah MacLeod, The Kincardine: 21 Jan 2022)

NOTE: This article concerns actions taken to discover massively impermeable rocks suitable for the storage of nuclear waste in Ontario, Canada.

Old Rock Day is recognized annually on January 7 to encourage people to learn about the Earth's history through rocks and celebrate the western scientists and Indigenous Knowledge Keepers who help us understand what these rocks are telling us. At the Nuclear Waste Management Organization (NWMO), our geologists and geoscientists are studying the rock deep underground through activities such as borehole drilling in the South Bruce and Ignace areas to confirm that the rocks are suitable for hosting a deep geological repository to store used nuclear fuel. This work is significant because through the rock we also learn about the properties of water deep underground. Indigenous Knowledge Keepers, including our Indigenous Relations, Engagement teams and our Council of Elders and Youth help us further expand on this western science way of knowing.

Both western science and Indigenous Knowledge rely on the rocks (grandfathers) to pass on generational knowledge to inform the NWMO's work. *Supplied*

Indigenous peoples have a deep connection to the rock and the water that exists within it. Rocks have a spirit and story to tell, and it is our responsibility to listen and gain a deeper understanding of the memory they hold. "Within Indigenous worldview, the rocks are referred to as grandfathers. This is a way of describing the generational knowledge they carry. In the context of geoscience, the NWMO's approach to site characterization activities has been expanded by the knowledge that both western science and Indigenous Knowledge rely on the rocks (grandfathers) to pass on that knowledge and inform the NWMO's work," said Jessica Perritt, Section Manager, Indigenous Knowledge & Reconciliation. When we follow the water and rock, it reveals life. How rock and water survive, gives us hints of history, providing valuable information to inform our work.



Indigenous Scie

Oregon's psilocybin program stands on thousands of years of indigenous experience

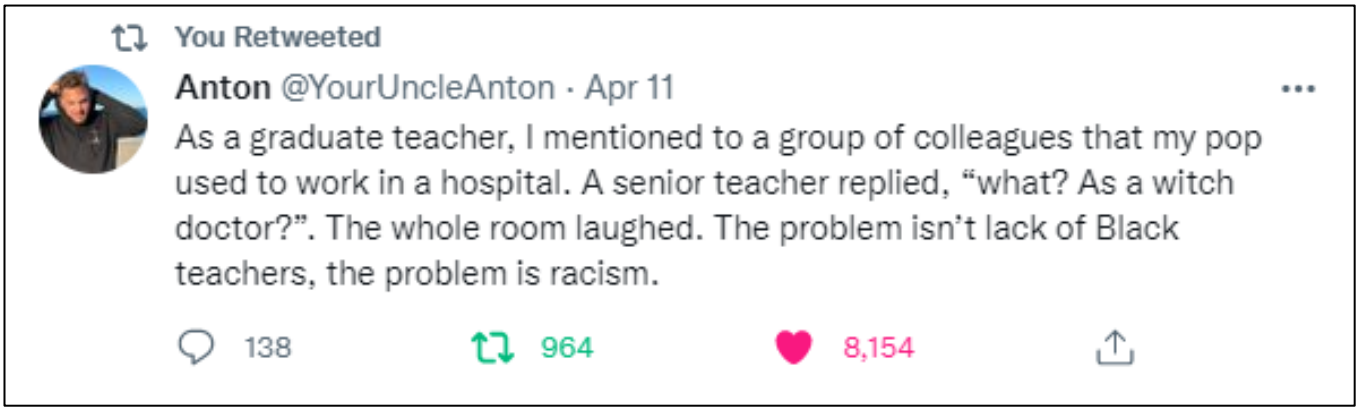
(Lynne Terry, Oregon Capital Chronicle: 13 April 2022)

In Oregon, psilocybin will be used to treat mental health issues. U.S. studies have found that it's a promising treatment for depression, anxiety and PTSD. But its use among indigenous communities is much wider. "For many indigenous people of Mexico, these mushrooms are part of a sacred and ancient tradition," the paper said. It's been used to treat both spiritual and physical illness by inducing hallucinations and creating a "trance-like experience that is thought to allow dissociation of the soul from the body," the paper states. The experience facilitates introspection, revelations and self-healing, it says. "While practices vary between indigenous groups, in general ceremonies are always done with care at night in a quiet place guided by an elder or shaman, no meals, alcohol, medicine or drugs are taken in advance, and travel is discouraged for a week after," according to the paper.

Oregon has approved the use of this species, Psilocybe cubensis, in its psilocybin program. *(Getty Images)*

UMaine's new aquEOUS program applies indigenous knowledge to contemporary aquaculture *(Penobscot Bay Pilot: 24 Feb 2022)* Link

ORONO — Undergraduate students from across the nation will learn about sustainable aquaculture in Maine through the lens of Indigenous science and traditional ecological knowledge in a new University of Maine initiative funded by the United States Department of Agriculture. AquEOUS: Aquaculture Experiential Opportunities for Undergraduate Students, led by the UMaine Wabanaki Center and Aquaculture Research Institute (ARI), is one of 23 USDA-funded Research and Extension Experiences for Undergraduates (REEUs) awarded this year. The UMaine fellowship program will be offered annually for five years and will ultimately include 42 students. Students and staff will complete 10-week research projects and participate in training that enhances inclusive science communication skills, traditional ecological knowledge and field techniques.



BIPOC scientists explore barriers, equity in 'Young Nerds of Color'

(Celina Colby, The Bay State Banner: 23 Feb 2022) **Link**

Science takes the stage at Central Square Theater in Cambridge this month, with "Young Nerds of Color," an Underground Railway production arranged by playwright Melinda Lopez and directed by Dawn M. Simmons. Drawn from more than 60 interviews with diverse scientists, the production explores the challenges and victories of working in the field as a BIPOC (Black, Indigenous and people of color) individual. Taking key themes and stories from these interviews, "Young Nerds of Color" creates an imaginary encounter among a group of these scientists.

Daniel Rios, Jr., Kortney Adams, James Ricardo Milord, Lindsey McWhorter, Alison Yueming Qu, and Karina Beleno Carney in "Young Nerds of Color." *PHOTO: NILE SCOTT STUDIOS*

Like most fields, in science there are significantly greater barriers to entry for marginalized communities. Lopez remarks that the play works against the narrative that science is egalitarian and without bias. "Smart people of color are not the exception; they are the norm. We forget that. Intelligence is not the purview of the white community," says Simmons. "But the way that it's borne out, the way that it's enacted, is different by people's cultural identity, by their gender identity. All of these things shape how we come to ideas. And that is a good thing." There is real bias in the field to be tackled — but there is also hope and joy.

Using Indigenous knowledge to identify toxic shellfish - 'My ancestors were scientists.'

(Sarah Hoffman, Crosscut: 4 Mar 2022)

Rosa Hunter wants aspiring young scientists to know it's never too late. Hunter is the lab manager at the Salish Sea Research Center at Northwest Indian College on Lummi Indian Reservation. Her studies led to her work in the sea, where she realized that her grandmother's guidance when Hunter clammed as a child could inform her work identifying toxic shellfish in our oceans. "She would stand out there and just do an environmental scan. She just looked at the environment around and she would say either we're digging here or we're not." Hunter said "From the Indigenous perspective versus the scientific perspective, it all came full circle, how it's connected."

Hunter works to bridge the narrowing gap between classical science and the scientific discoveries and intuition that Native cultures have passed down through generations, centuries before the scientific method even existed. By combining her grandmother's insights with measurements like the temperature and pH of seawater, Rosa is helping to explain how toxicity in shellfish impacts our environment. "I was like, holy moly, my ancestors were scientists. I come from a line of scientists. That blew my mind," Hunter said.

Professor develops tool to identify Indigenous values

(University of Oregon: 16 Feb 2022)

UO professor Michelle Jacob believes one of the keys to working toward better equity and justice is to turn to Indigenous values and cultural teachings to rethink the way organizations, institutions and individuals operate. Settler colonialism left a damaging legacy that positioned Indigenous communities and the environment as "less than" and disposable, she said, and adopting Indigenous values could help address that harm. To help guide the effort, Jacob teamed up with researchers from other institutions to develop a tool that uses Indigenous values to offer different ways of thinking and being. Jacob contends that settler colonialism, capitalism and patriarchal forces have sculpted a landscape of racial superiority, ownership and possession where Native people have been cast as lesser beings, the earth is being destroyed, and resources and people are exploited. Jacob points to health care and the educational system as examples of institutions that are being problematically driven by white, male, Western, heteronormative culture. In Western education, she highlights how competitiveness is integral to the system and grades have been turned into a commodity. "Some of these ways of operating are so deeply ingrained that they may seem natural or inevitable," Jacob said. "But if public schools, health care, environmental groups and other entities don't interrogate their values, it allows the damages to continue unchecked."

The Arctic Revolution That's Changing Climate Science

(Danielle Bochove, Bloomberg: 23 March 2022)

Andrew Arreak.
Photographer: Galit Rodan/Bloomberg)

Science in the Arctic has, until recently, tended to ignore those living on the front lines of change. There's a predictable pattern. Researchers from the south arrive, wearing bright-colored Gore-Tex. They hire Inuit guides to patrol for polar bears or collect samples. And they leave laden with data that, to locals, is often neither accurate nor meaningful. (There is) a new wave of climate science informed by Inuit knowledge and perspective. Learning how Inuit and other Indigenous peoples relate and respond to environmental change is crucial, as science begins to focus more on adaptation and resilience, instead of merely tracking or predicting destruction.

Across the Arctic, warming is taking place at least twice as fast as in the rest of the world; new research suggests it may be four times faster. Glaciers are receding, permafrost is collapsing, and the animals the Inuit hunt are becoming harder to find. The ice that Andrew Arreak knew by intuition as a Pond Inlet teenager is growing unfamiliar to him now, its footprint and historical patterns of strength and weakness in flux. "Sea ice is coming a little later, and melting a little earlier, each year," says Arreak, a 37-year-old Inuit scientist with SmartICE, an organization that tracks changes in the ice in 32 communities across Canada's north. "The conditions are getting unpredictable."

"It's not just the thickness of the ice, it's also what type of ice it is, whether it's imported ice or newly formed ice," says Arreak, who's also a hunter. "Imported" ice can be years older and therefore several times thicker than the ice that develops with the winter freeze. Chunks will float free in summer and travel south across Lancaster Sound, freezing into bunches and attaching to the new ice formations around Pond Inlet, which sits near the eastern entrance to the Northwest Passage. Where the pieces join there are jagged seams of uneven heights that make snowmobile travel treacherous. What happens at the top of the world—where ice provides a reflective planetary shield and permafrost acts as a 1,400-gigaton carbon sink—matters to everyone on Earth. But for Arreak and his community, things are changing here and now.

"Inuit are the original Arctic scientists," says Trevor Bell, a geography professor at Memorial University of Newfoundland, who co-founded SmartICE, which is now an independent Inuit-run operation. "They've been there making observations of the ice and the land for centuries to millennia. In their heads, they have the longest records of sea ice changes in the world." The average age in Pond Inlet—or Mittimatalik, as it's known in Inuktitut—is just 21. This is the first generation with mobile phones, reliable access to the internet, and the skills to play an active role in "southern" science. Ikaarvik, which means "bridge," is a group created to improve the accuracy and relevancy of Arctic research by incorporating Inuit perspectives and, in particular, knowledge from Inuit elders. Arreak was one of its founders. Today its members are discussing grant applications, the need to recruit new members, and a stack of proposals from scientists seeking their input—including a study on microplastics in Arctic waters and research on bowhead whales.

You Retweeted

Dominic HK Beaudry @DhkBeau · Mar 22

In Ojibwe our words for World Water Day are Giitaakiing Nibiish Giizhigad. March 22nd is world water day pictured here Anishinaabe water protector Autumn Peltier.

10

You Retweeted

Tanya Talaga ✓
@TanyaTalaga

"In the Anishinabek world view, the lake is a living being, an entity - she is life." Read @jolenebanning's words on my favourite lake Gitchigumi @TheNarhwal Breaking up: Ice loss is changing one Anishinaabe fisherman's relationship with Lake Superior:

thenarwhal.ca

How a warming Lake Superior is affecting one Anishinaabe fisherman | The Nar...

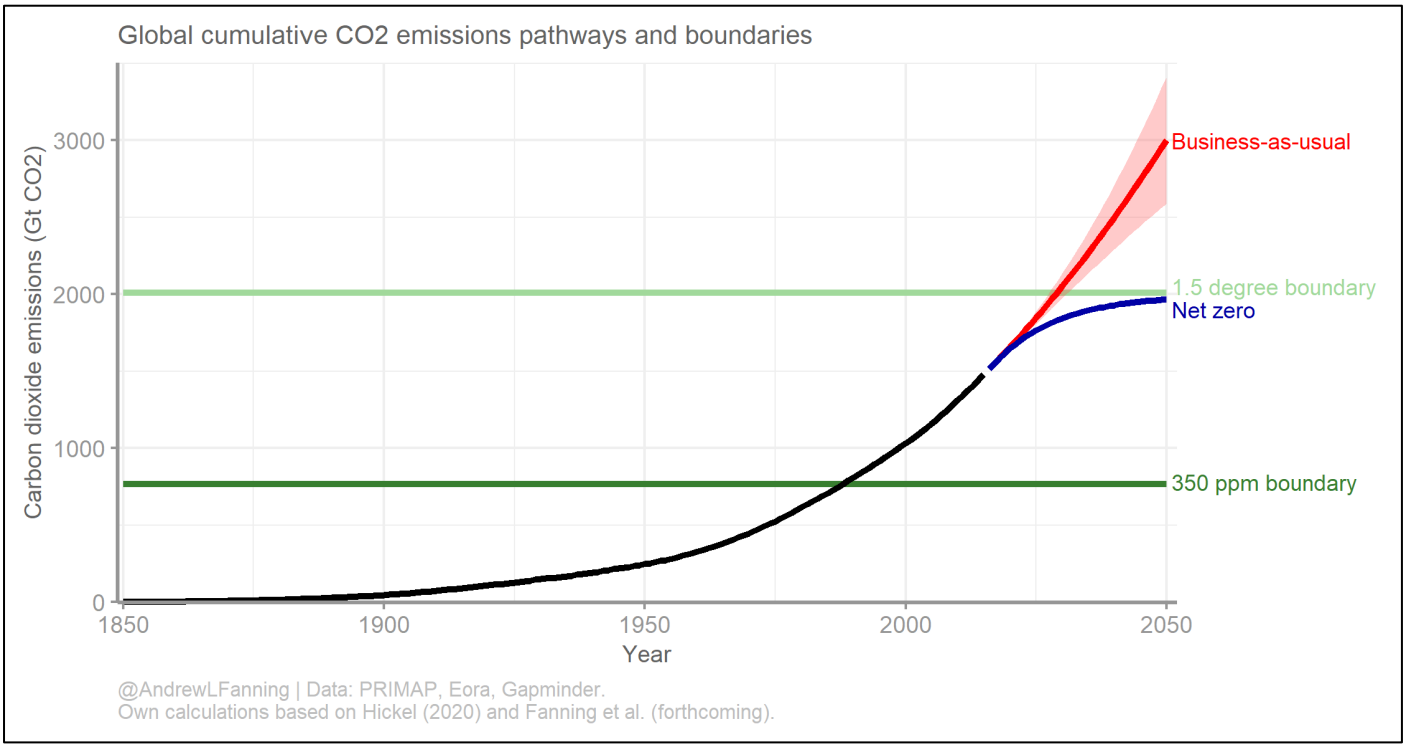
Lake Superior, also known as Gitchigumi, is warming faster than any of the Great Lakes, affecting the lives of fishermen like Phillip Solomon

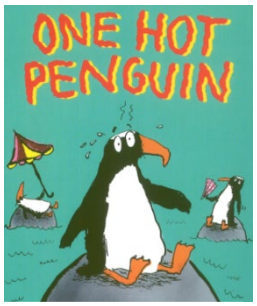
1:15 AM · Feb 24, 2022 · Twitter Web App

Record-Smashing Heatwaves Are Hitting Antarctica, the Arctic Simultaneously

(Dana M. Bergstrom, Sharon Robin and Simon Alexander, Science – The Wire: 25 Mar 2022) [Link]

Nothing Indigenous science related about this article. Just a not-so-subtle reminder that unless all the politicians in the world are threatened with immediate irrelevancy, future massive disruption to ways of life are guaranteed. See this chart of historic CO2 emissions below. If that isn't concerning, then I don't know what is. And then the recent news that both the Arctic and Antarctic had concurrent heatwaves completely beyond any expected probability…?!? Planet B anyone?





One Hot Penguin *by Jamie Rix - Penguin Books Australia*

Record-breaking heatwaves hit both Antarctica and the Arctic simultaneously this week, with temperatures reaching 47º C and 30º C higher than normal. Heatwaves are bizarre at any time in Antarctica, but particularly now at the equinox as Antarctica is about to descend into winter darkness. Likewise, up north, the Arctic is just emerging from winter. Are these two heatwaves linked? We don't know yet, and it's most likely a coincidence. But we do know weather systems in Antarctica and the Arctic are connected to regions nearest to them, and these connections sometimes reach all the way to the tropics. And is climate change the cause? It might be. While it's too soon to say for sure, we do know climate change is making polar heatwaves more common and severe, and the poles are warming faster than the global average.

Last Monday (March 14) air temperatures at the Australian Casey Station reached a maximum of -1.9º C. Two days later, they were more like mid-summer temperatures, reaching a new March maximum of 5.6º C, which will melt ice. This is the second heatwave at Casey Station in two years. In February 2020, Casey hit 9.2°C, followed by a shocking high of 18.3º C on the Antarctic Peninsula. Modelling suggests large-scale climate patterns are become more variable. This means this seemingly one-off heatwave may be a harbinger for the future under climate change. In particular, the Arctic has been warming twice as fast as the rest of the world. This is because the melting sea ice reveals more ocean beneath, and the ocean absorbs more heat as it's darker. In fact, the Intergovernmental Panel on Climate Change (IPCC) projects Arctic sea ice to continue its current retreat, with ice-free summers possible by the 2050s.

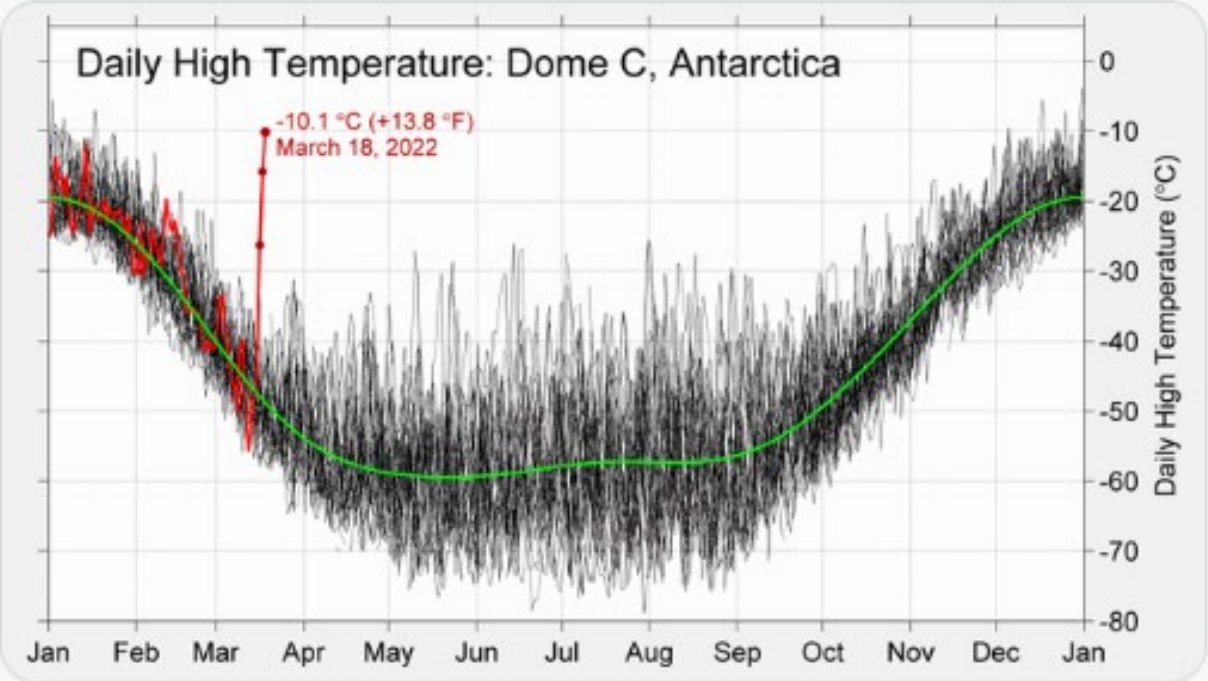
You Retweeted

Dr. Robert Rohde @RARohde · Mar 21

🔥Heat wave in Antarctica, +38 °C (+68 °F) above normal.

That's not an error, or a typo.

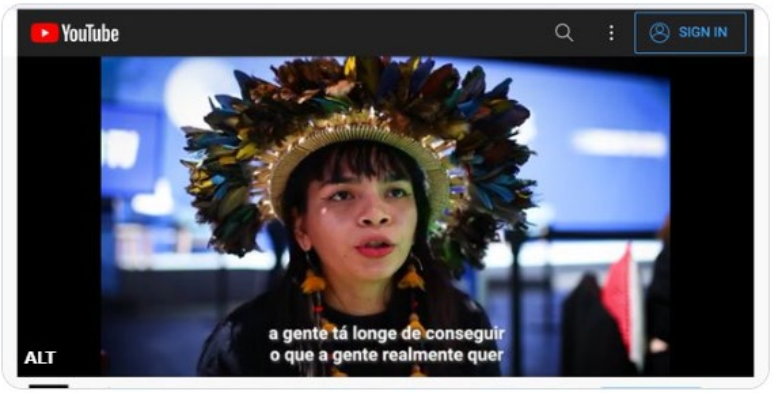
The remote research station at Dome C recorded a temperature nearly 40 °C above normal for this time of year, beating the previous March record by a startling 20 °C.



220 6,429 10.3K

Coimbra Sirica
@Coimbra_

"...It is not enough to talk about only about the rights of Indigenous peoples; they must be at the center of conservation proposals & we need to support them. They have been subsidizing the rest of us; it is now time to pay our fair share."

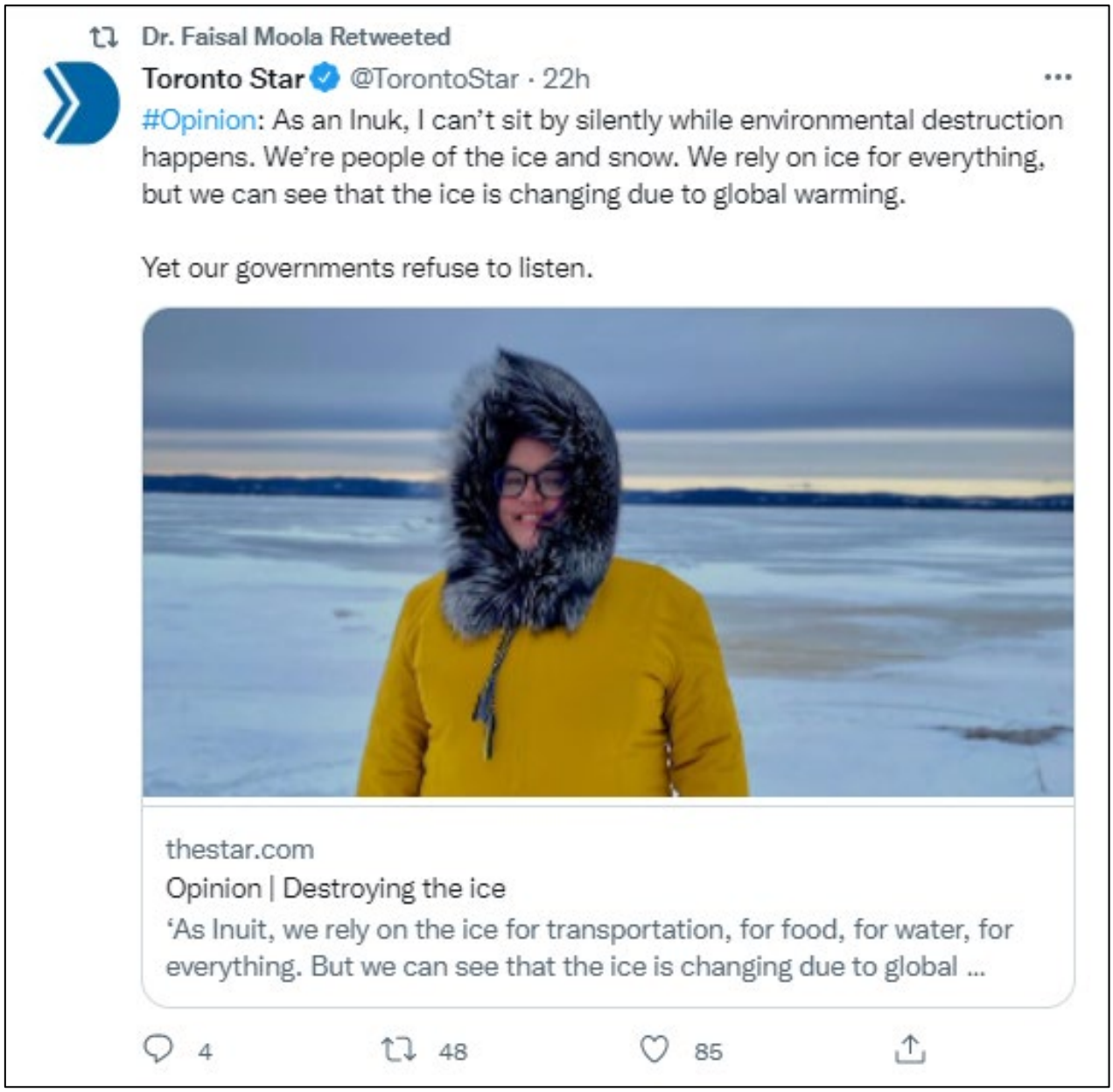


11:09 PM · Mar 18, 2022 · Twitter Web App

Mix modern science, indigenous wisdom to mitigate climate crisis

(Bharati Chaturvedi, Hindustan Times: Mar 14, 2022) [Link]

Climate change is altering our planet irreversibly. Yet, rarely do we get the opportunity to talk to people whose everyday lives are viscerally tied to nature. Last week, I met with Keith Wolfe Smarch, a 60-year-old indigenous carver and hunter in the Canada's Yukon territory. The wise man talked about mice. During the last few years, temperatures have started shifting from high to low rapidly, which forces the snow on top to melt and freeze back into ice. The mice continue to feed under the snow, but under a sheath of ice. Many don't even survive. Nor do the iconic Great Grey Owls, who prey on mice. With the new ice layer, they can no longer hear the mice, as they once did, under the snow. And if they discern dinner, they can't break the ice to serve themselves. The numbers of both the owls and the mice have dropped, Keith says. Till five years ago, he'd hear the birds hoot all night. Now, its down to a few times a year.



New Film Explores Combining Indigenous Knowledge and Western Science to Understand Waning Arctic Sea Ice *(Columbia Climate School |January 21, 2022)*

Under human-driven climate change, the Arctic is warming much faster than the globe as a whole. This is disrupting ecosystems, landscapes and seascapes that indigenous communities have depended on for countless generations. Five years ago, facing momentous changes in coastal sea ice, Iñupiaq residents of the Native Village of Kotzebue, together with scientists from Columbia University and the University of Alaska Fairbanks, co-developed questions to understand changes going on within Kotzebue Sound, and how the community's future might be affected by climate change. The project, called Ice Bridges, or Ikaaġvik Sikukun in the Iñupiaq language, melded indigenous observations, monitoring from aerial drones, geophysical measurements within the ice and water, and ocean and marine mammal science to address questions forged through this dialogue. The first peer-reviewed studies have been published, and a 14-part film series on the effort has been made available on YouTube. In this special Sustain What episode from the Columbia Climate School, we celebrate the launch of the feature-length film, produced by Sarah Betcher of Farthest North Films. The film chronicles the years-long study and the relationships it forged. It explores lessons that can inform efforts around the world to bridge local and western science when tackling challenges where the impacts of climate change are greatest.

Roswell Schaeffer Sr., an Iñupiaq elder and hunter from Kotzebue and co-author of a recent study of ice-season changes, hunts for bearded seals, May 2019.

(Courtesy Sarah Betcher, Farthest North Films)

ICE EDGE - The Ikaaġvik Sikukun Story

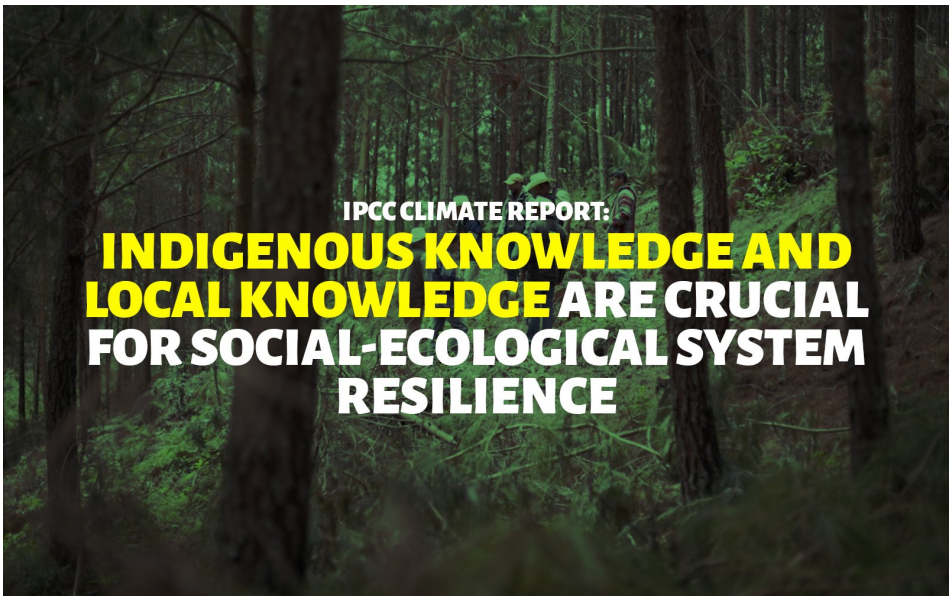
e) Europe

Traditional knowledge guides protection of planetary health in Finland

(Jane Palmer, Mongabay: 31 March 2022)

Undisturbed peatlands act as carbon sinks and support biodiversity. Finland has drained 60% — more than 60,000 km2 (23,000 mi2) — of its peatlands, releasing vast amounts of carbon dioxide into the atmosphere, and destroying entire ecosystems. But scientists and Finnish traditional and Indigenous knowledge holders are collaborating to rewild and protect peatlands and associated forests and rivers, turning them into carbon sinks again, while bringing back wildlife and supporting fishing, hunting, and even tourism, offering economic benefits to local communities.

These Finnish collaborations are already serving as both inspiration and guide to those seeking to use rewilding to curb climate change, enhance biodiversity, create sustainable land use systems, and restore forest, freshwater and wetland ecosystems, while supporting traditional communities. “Rewilding is very much about giving more freedom to nature to shape our landscapes, and looking at nature as an ally in solving socioeconomic problems,” says Wouter Helmer former rewilding director of Rewilding Europe. “It’s a holistic way of putting nature back on center stage in our modern society.”



Greta Thunberg condemns UK firm's plans for iron mine on Sami land

(Daniel Boffey, The Guardian: 11 Feb 2022)

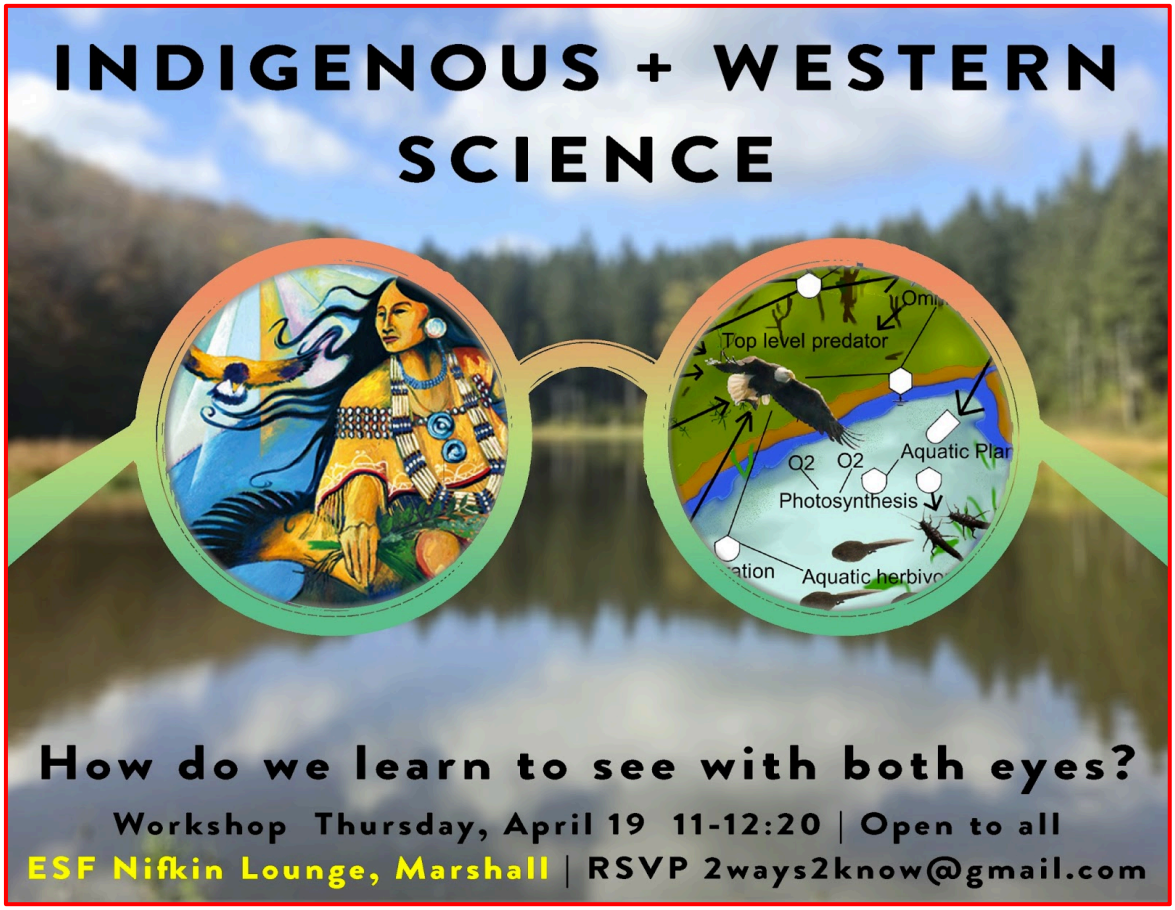
A British company has fallen foul of Greta Thunberg, Unesco, Sweden's national church, and the indigenous people in the north of the country over plans for an open-pit mine on historical Sami reindeer-herding lands. The clamour of opposition was voiced as Beowulf Mining, headquartered in the City of London, suggested it was "hopeful" of a decision within weeks of a 5 sq mile iron-ore mine in an area where Sami communities have lived for thousands of years.

The Sami parliament, the representative body for people of indigenous heritage in Sweden, has in recent days written to the Swedish government warning that the mine will destroy grazing areas and cut off the only viable migratory route for reindeer followed by the Jåhkågasska Sami community, who move westerly with their animals to the high hills of the Laponian area on the Norwegian border for the animals to calve during the spring. Sami communities to the west and east of the mine would also be hit through a reduction in viable grazing areas already under pressure from changes to the snow conditions attributed to the climate emergency, logging, power lines and the development of a hydroelectric dam, the parliament said.

Beowulf Mining wants to establish an iron-ore mine on lands traditionally used by the Sami.
Photograph: Carl-Johan Utsi/The Guardian

UPDATE: **Mining company wins**

The Bulletin of the Indigenous Science Network is distributed four times a year via email directly to members. Membership is open to all. If interested in being a part of the Network, please contact the Coordinator via email at IndigenousSciNet@yahoo.com. Issues distributed in February, May, August and November each year.



Following on from the recent energetic discussions in New Zealand regarding the place of Maori knowledge in their school and university science curricula (see articles in our previous bulletins of Aug '21, Nov '21 and Feb '22), this debate continues. On the following pages we list recent articles and commentary that explore Indigenous Science and how it relates to the mainstream, dominant, colonial cultures' science (a.k.a. Western Science or, as some would say, real science).

IRANZ & STEMM - Science, Technology, Engineering, Mathematics, & Mātauranga

(Independent Research Association of New Zealand: 9 Sept 2021)

Recent discussions about science and mātauranga Māori have highlighted the need for IRANZ members to note our collective support for not only our Māori colleagues but also mātauranga Māori.

"As a collective, we aim to develop sustainable solutions to the challenges we all face, with an open-minded, inclusive, and bold approach that incorporates values beyond traditional science. In many research facilities, including our members, indigenous and non-indigenous researchers are working in partnership to solve some of these significant challenges. We are committed to upholding the value of mātauranga Māori, and the mana of our Māori colleagues and their marae communities.

Dr John McDermott, IRANZ Chair

Mātauranga Māori concepts are a new and challenging space for many of us in science, but as scientists we support the knowledge gains that mātauranga Māori presents. Recent discussions surrounding science and mātauranga Māori highlighted the opportunity for IRANZ members to lead by example and undertake our research in a more holistic manner.

IRANZ is excited to embrace our three newest member organisations, who are Māori-led Independent Research Organisations: Mātai Medical Research Institute, Takarangi Research Group, and Te Tira Whakamātaki. We look to them to help us find sustainable solutions to the challenges IRANZ faces to support mātauranga Māori and partnerships with Māori. We strive to provide the right culture in our organisations to incorporate mātauranga Māori into our research programmes and to welcome Māori into our research teams.

New Zealand Royal Society drops action against controversial letter writers

(Royal Society Te Aparangi: 11 Mar 2021) Link

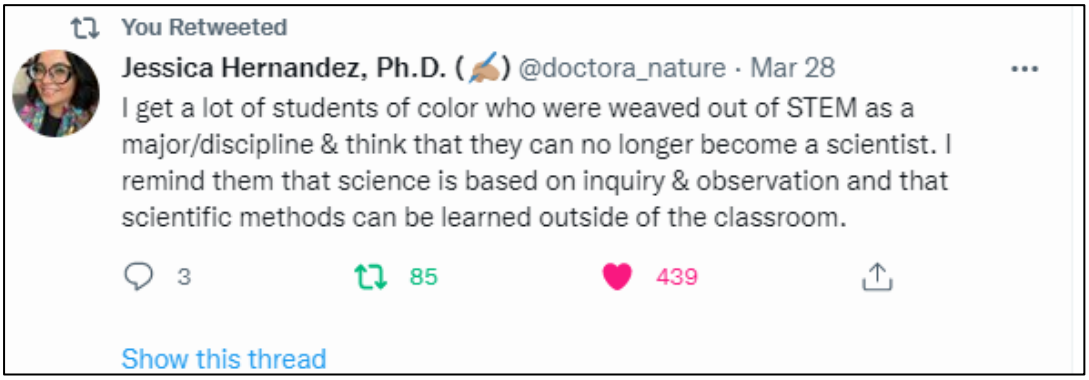
New Zealand's learned academy has discontinued disciplinary action against two of the country's most distinguished scholars for criticising a proposal to incorporate indigenous knowledge in science curricula. The Royal Society of New Zealand (RSNZ) has decided not to proceed with an investigation into medical scientist Garth Cooper and philosopher Robert Nola over a controversial letter the pair and five colleagues published in current affairs periodical The New Zealand Listener. The seven drew fire for disputing the equivalence of mātauranga Māori, or Māori knowledge, and science. The RSNZ received five complaints demanding disciplinary action against the society fellows who had co-authored the letter.

New Zealand: the wokest country in the world

(Patrick Whittle, Spiked: 7 Mar 2022) Link

This article is a truly horrible example of the desire of conservative commentators to whip up fear and loathing of any situation containing nuances beyond their saloon bar mentality. Starting with the idea that Maori science is a joke, the author then segues into the politics of fat studies and concludes by deriding the actually quite well understood proposition that many Indigenous cultures recognise more than two genders. Back to your cave Neanderthal! (And apologies to any woke Neanderthals out there).

New Zealand has always punched above its weight. Yet where 'once were warriors', New Zealand is now the wokest country in the world. Take the group of Kiwi scientists currently under investigation by their own professional body, the New Zealand Royal Society. These academics' heretical thoughtcrime? Last year they had the gall to publicly question the promotion of Maori indigenous 'ways of knowing' as the equivalent of modern science in New Zealand's national curriculum. This farce has even drawn the attention of the great Richard Dawkins, whose neat tweet nicely sums up the problem: 'Creationism is still bollocks even if it is "Indigenous Ways of Knowing" bollocks. Doubtless [it is] of great anthropological and aesthetic interest but [it is] not science and not true. Shame on the NZ Royal Society.'



Indigenous knowledge 'gives us a much richer picture': Q&A with Māori researcher Ocean Mercier *(Monica Evans, Mongabay: 25 February 2022)*

Ocean Mercier, a member of the Ngāti Porou iwi and head of the School of Māori Studies at Victoria University of Wellington. *Image courtesy of Ocean Mercier.*

The Māori, the Indigenous people of Aotearoa New Zealand, have extensive knowledge about oceans and marine environments, which has not always been valued or recognized. In recent decades, Māori researchers and knowledge holders have elevated the position of mātauranga (Māori traditional knowledge) about oceans in academic and community contexts. Ocean Mercier is an Indigenous researcher who works at the interface of mātauranga and Western science, on issues such as marine and freshwater conservation and management. She recently spoke with Mongabay about the benefits, challenges and "crunchy bits" of working across knowledge systems in this way.

There are some really beautiful metaphors in te reo Māori that are deep-seated reminders of our connection to the natural world. Sometimes that can become a bit clichéd: "As Māori, we're intrinsically linked to the natural world." I read that often, because I examine master's and Ph.D. theses, and sometimes I kind of feel like, "aw, puke!" I want to see specific examples. There is so much evidence out there that we shouldn't just take the lazy route and float the cliché without digging into the luscious detail of that statement. I started learning te reo Māori [the Māori language], my heritage language, and I became close with Te Kawa a Māui, the Māori Studies department, through that process. They had a course called Māori science, and at some point, they asked me, as someone with a science background, to teach it. And that was it! I'd been thinking a lot about how to reconcile the world of what we call Western science with the ways that Māori were generating and applying knowledge. This particular course unapologetically called itself Māori science, but that's been a contentious term — and continues to be for lots of people. I enjoy being in that crunchy part of the discussion: the interface between knowledges and within knowledge systems. It's also a really interesting blend of the physical, natural and social sciences.

A lot of Māori science is about observation and interaction with the natural world, such as noticing the different ways light behaves through different objects (which is of course physics), and engineering buildings and vehicles (i.e. *waka* - canoes) in tune with those forces. I was intrigued by the interface, and also by the conversations where one culture says another culture doesn't have science, and how that can be presented as a non-contestable assertion. There are all sorts of fascinating discussions in this space; since falling into it, I've never left.

Indigenous Science and the Science Curriculum: The New Zealand Debate

(Michael R. Matthews; History, Philosophy and Science Teaching Newsletter: March 2022) **Link**

ISN member Michael Matthews is an Honorary Associate Professor with UNSW and previously Foundation Professor of Science Education at University of Auckland. He has edited many journals related to science and culture and lived and worked for many years in New Zealand. He is uniquely placed to give an opinion on the current debate.

In this paper, Matthews implies that science can only be science if it fully complies with the orthodoxies of the western scientific tradition. The concept of an Indigenous science is therefore not seen as viable, firstly because it must be contextualised and the truth of science should exist above human frailty, paying no heed to culture. Consequently, Indigenous Knowledge Systems and Traditional Ecological Knowledge may be used to illustrate science facts but they should not be considered scientific themselves. Most significantly, Indigenous science is inherently spiritual, which immediately disqualifies it from being "real" science. This network takes an alternative view (hint – check our name), but in the interests of transparency and acknowledging that many scientists, academics and commentators agree with A/Prof Matthews, please read on. And note the words below are abridged from the full article which should be read in its entirety. Further correspondence on these issues from members is welcome.

Everywhere there is rightful concern to understand the relationship between on the one hand indigenous knowledge systems (IKS) and traditional ecological knowledge (TEK) and on the other orthodox 'Western' science. And, especially, how to address this relationship in education. More specifically: Should indigenous, or cultural, knowledge about the natural world be taught inside science programmes or alongside them in separate social science, geography, religion, or cultural studies programmes?

If mentioned, inside science programmes, teachers could elicit, or introduce, local indigenous understandings of some events or processes, and then progressively show scientific explanations of the same. In New Zealand, in the middle of 2021, a large public and national debate erupted over the aligning of traditional Māori knowledge (Mātauranga Māori) and science. In this latter option, IKS and TEK basically serve instrumental purposes in the teaching of science; they are not in the curriculum on their own intrinsic account but are there to serve another purpose.

The Royal Society New Zealand was asked to take 'grave action' against three esteemed Society Fellows on account of the instrumentalist views they expressed on the matter in a national magazine.

In 2019 an Opinion Piece in this Newsletter – 'The Defence of Science and the Status of Māori Knowledge' – written by Auckland professors Michael Corballis, Elizabeth Rata and Robert Nola, surveyed the NZ educational and cultural landscape prior to the current controversy. They argued:

> *while Mātauranga Māori has much to offer in terms of culture and values, it also subverts those aspects of science – namely objectivity, universality, and dedication to progress – that can further advance the understanding of nature and help find solutions to the major problems afflicting the planet.*

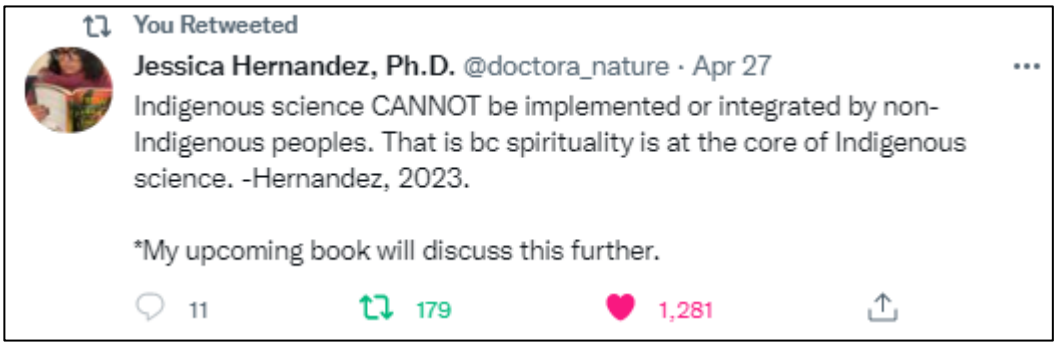
An explicitly constructivist Draft National School Science Curriculum bringing Mātauranga Māori

into the New Zealand curriculum had been written and circulated in the 1980s. Warwick Don (1933-2014), a senior lecturer in Zoology at the University of Otago, spoke for many scientists and traditional educators when he wrote:

> *…science is conducted irrespective of the cultural milieu of its participants. The recognition of any 'cultural context' in a science syllabus only introduces an irrelevance which will inevitably distort and could even destroy the very fabric of science education.* (Don, 1989)

The ontology of many ethnoknowledge systems, including MM, include non- material, active, nonlawful entities such as angels, spirits, jinn, devils and the like. The spirit world is omnipresent and active in most traditional worldviews (and a good many Western ones). Such ontologies allow for animism wherein trees, rocks and landforms are animate, they have their own spirits, life forces and, for some, consciousness. Such an ontology cannot be stirred together with scientific ontology.

The seemingly attractive option of integrating MM and science, bringing the former into the science programme, and teaching it as science is, on examination, not so attractive.



Indigenous Science Network

You might like · See more

Prof Jodie Bradby
@JodieBradby

Can't unsee this..

Cambridge University
@Cambridge_Uni

Congratulations to the nine #Cambridge scientists announced as Fellows of the @RoyalSociety today!

This honour recognises their exceptional contributions to science.

cam.ac.uk
Nine Cambridge scientists among the new Fellows announced today by

8:05 PM · May 12, 2022 · Twitter for i

Professor Jason Byrne @CityByrne · 7h
Replying to @JodieBradby
Wow - in the 21st century we are still doing this! 🙈 Massive disappointment
2

Prof. Nerilie Abram @ClimateNerilie · 16h
Replying to @JodieBradby
Really, how did they expect this to go well?
3

A/Prof Kirrily Rule @KirrilyRule · 2h
Replying to @JodieBradby
Just when i think we are making progress in highlighting gender/race disparity in STEM... 🤦‍♀️
3

Dr Bobbi Fleiss @BobbiFleiss · 7h
Replying to @JodieBradby
But don't worry, if we all do training in being assertive, leaning in and dealing with our imposter syndrome we can all be pale and male too!! 🤡🤡
WTF @Cambridge_Uni - disgusting that you think there are no worthy recipients of any other ilk.
1 8

Awardees for 2022 announced by the Australian Academy of Science
(AAS: accessed 15 May 2022 – additional text by the ISN Coordinator)

It seems Australia has got the right idea on the issue of representation when compared to Cambridge University - as seen on the previous page (it matters!)

2022 awardees

Outstanding contributions to science have been recognised by the Australian Academy of Science with 20 of Australia's leading scientists receiving a 2022 honorific award.

The Australian Academy of Science's 2022 honorific awardees

One wonders what the general consensus about the existence and validity of Indigenous science would be among this group? Differing backgrounds, differing experiences, differing attitudes, differing beliefs, differing opinions to complex issues. Sometimes there can be no one definitive answer to issues such as this. Empathy, respect and understanding can only take you so far. Agree to disagree?

Reviewing the question of 'Māori science'

(Georgina Tuari Stewart, Associate Professor, Te Kura Mātauranga/School of Education, Auckland University of Technology; New Zealand Science Review Vol 75 (4) 2019) Link

Published in 2019, this article forms part of a Special Issue of the New Zealand Science Review on Mātauranga and Science. And possibly the last word on this topic, which we have now covered in four consecutive issues!

Any discussion about whether or not 'Māori science' exists faces the prior difficulty of succinctly but adequately defining science. Much literature on multicultural science education, including the majority of papers on the 'Māori science' question, falls into the trap created by this difficulty. The 'Māori science' debate (and, more generally, the 'multicultural science' debate (Hines 2003) encompasses complex questions in philosophy, science, culture, identity, technology and politics, so it is hardly surprising that much of the published commentary is flawed and falls apart on closer examination.

Standard disciplinary philosophy of science would say, for example, that reason 1 listed below is about technology, not science, and that reason 2 is based on an inadequate concept of science as 'nature study'. Nevertheless, both reasons have some merit, and are often rehearsed as arguments in favour of the concept of 'Māori science'.

The case for 'Māori science.'

These lists, distilled from my years of research into Pūtaiao, summarise the main reasons for and against the proposition that mātauranga Māori counts as science:

1. Traditional knowledge enabled Māori ancestors to live and flourish in harmony with the natural world in Aotearoa, employing sustainable technologies such as kūmara pits and harakeke (flax) fishing nets and lines.

2. Many items of traditional Māori knowledge are based on accurate, detailed observations of macroscopic natural phenomena (plants, animals, astronomical patterns, etc.), capable of generating data of scientific validity and interest.

3. The cosmogenic Māori nature narratives work together as an overarching paradigm of knowledge, replacing in that role the science framework of theories and commitments that underpins the modern/Western worldview (Roberts et al. 2004).

4. Māori knowledge is not necessarily restricted to the three-dimensional reality of the laws of physics, and therefore may have access to wisdom that Western science has disallowed within its canon.

5. The original meaning of the word 'science' comes from the Latin word meaning 'knowledge' so on grounds of epistemic fairness, mātauranga Māori deserves to be recognised as valid knowledge, i.e. as a form of science, in its own right.

6. Mātauranga Māori can also be understood as a critical Māori viewpoint on science and its applications in society in Aotearoa-New Zealand – for example, as a Māori critique of scientific racism and justifications for colonising damage done to Māori people, culture and environments.

7. Mātauranga Māori sometimes seems to know more than science about very complex phenomena, such as the essential nature of a human being, or the mysteries of reality: mātauranga Māori has values and metaphors that can provide fresh views on epistemology, or philosophical questions of knowledge.

The case against 'Māori science.'

1. The laws of science apply equally at all times, in all places, to all human beings; in other words, science is based on universalism (or universalist philosophical commitments).

2. Resulting from the above point, science is an acultural (or trans-cultural) form of knowledge, so to place a cultural modifier (such as 'Māori') before the word science is incoherent i.e. makes no sense.

3. Science knowledge is based on empirical experimentation and testing using well-established methodological norms (the 'scientific method') i.e. science tests itself against empirical reality.

4. Science knowledge has well-defined criteria and a vast archive of experience that ensure it adheres to the highest epistemic standards and is the 'best' possible knowledge about reality available to humans.

5. Science knowledge is subject to ongoing revision as empirical knowledge advances; in other words, science is 'fallible knowledge' that changes over time in ways that orthodoxy or faith-based knowledge does not.

6. Scientific research is subject to the scrutiny of a community of peers, and this community ultimately decides the current status of scientific knowledge on any topic.

7. Science enabled the rapid advances in human knowledge and its applications that characterised the post-Enlightenment rise of modern European culture

Conclusion: the educational value of the 'Māori science' debate

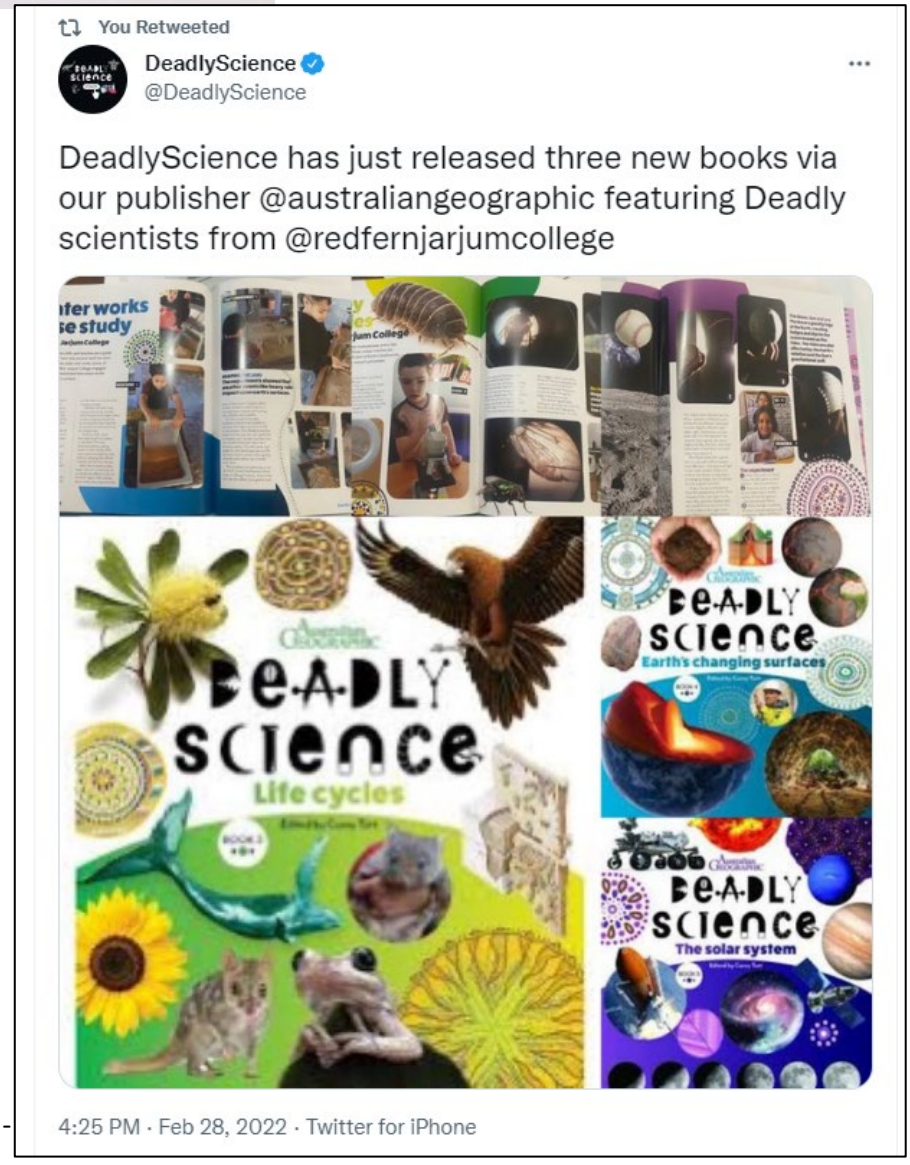
The question of 'Māori science' is more of a nexus of semantic, philosophical and political arguments, rather than a simple yes-or-no question. Whether Māori knowledge 'counts' as science is more of a provocation than a research question to be answered; it has no simple or 'correct' answer, as the 'right' answer depends on what is meant by 'science', and the purpose of the question. The debate about Māori science, in other words, is a specialised form of the wider debate about the nature of science (Chalmers 2013). Understood as more of a political than an epistemic knowledge claim, the concept of 'Māori science' is also a post-colonial critique of science (McKinley 2001), which can also be called 'Kaupapa Māori science' (Stewart 2010): a concept intended to sharpen rather than usurp ideas about the accepted foundations and canons of science knowledge, while remaining critically aware of science's past and current enslavement to naked power, in the form of money and social privilege.

RESOURCES - AUSTRALIA

Aboriginal Science Topic Cards, *Riley Callie Resources, 2021*

A beautifully visual set of 25 Aboriginal Science Topic Cards which celebrate the role science has played and continues to play in Aboriginal culture. These Topic Cards contain 25 examples of the scientific ingenuity and innovation of Aboriginal people, and can be used as a starting point for engaging in learning about the role of science in Aboriginal culture.

Cards are double-sided; one side with a beautiful visual image to accompany the topic, and the other side a snapshot of information to get you started in your learning on that particular topic. Cards cover content such as: Boomerang and Aerodynamics, Toxic to Edible, Bush Medicine, Traditional Fire Management, Indigenous Rangers and more!



Australian Aboriginal Seasonal Calendars

(NESP: accessed 15 Feb 2022)

Do you want to include more First People's knowledge into your classroom? These beautiful seasonal calendars, designed in a circular fashion to mimic the cyclical nature of nature, include references to the interconnected relationships of plants, animals and the weather.

Kakadu Seasonal Calendar, Ngurrungurrudjba (Yellow Waters)

Nyikina seasonal calendar, November 2020

A. Milgin, L. Nardea, H. Grey & S. Laborde. 2020. Birr inmany jada Warloongaryi nganka Woonyoomboo-ni - A Nykina seasonal calendar. Walalakoo Aboriginal Corporation in partnership with the National Environmental Science Program.

https://www.nespnorthern.edu.au/wp-content/uploads/2020/11/Nyikina_calendar-scaled.jpg

Nyikina seasonal connections poster, November 2020

A. Milgin, L. Nardea, H. Grey & S. Laborde. 2019. Birr Walangarri-yoonoo Nganka (Elements of Nyikina ecological science). Walalakoo Aboriginal Corporation in partnership with the National Environmental Science Program

https://www.nespnorthern.edu.au/wp-content/uploads/2020/11/Seasonal-connections-poster-scaled.jpg

https://www.nespnorthern.edu.au/wp-content/uploads/2016/10/Ngan-gi-seasons-calendar.pdf

https://www.nespnorthern.edu.au/wp-content/uploads/2016/10/Kunwinjku-Seasons-calendar.pdf

https://www.nespnorthern.edu.au/wp-content/uploads/2016/10/Walmajarri-seasons-calendar.pdf

https://www.nespnorthern.edu.au/wp-content/uploads/2016/10/Gulumoerrgin-Larrakia-seasons-calendar.pdf

https://www.nespnorthern.edu.au/wp-content/uploads/2016/10/Gooniyandi-seasons-calendar.pdf

https://www.nespnorthern.edu.au/wp-content/uploads/2016/10/Ngurrungurrudjba-Yellow-Water-Seasons.pdf

https://www.nespnorthern.edu.au/wp-content/uploads/2016/10/MalakMalak-and-Matngala-plant-knowledge-calendar.pdf

Indigenous Science Partnerships

(NESP: accessed 15 Feb 2022)

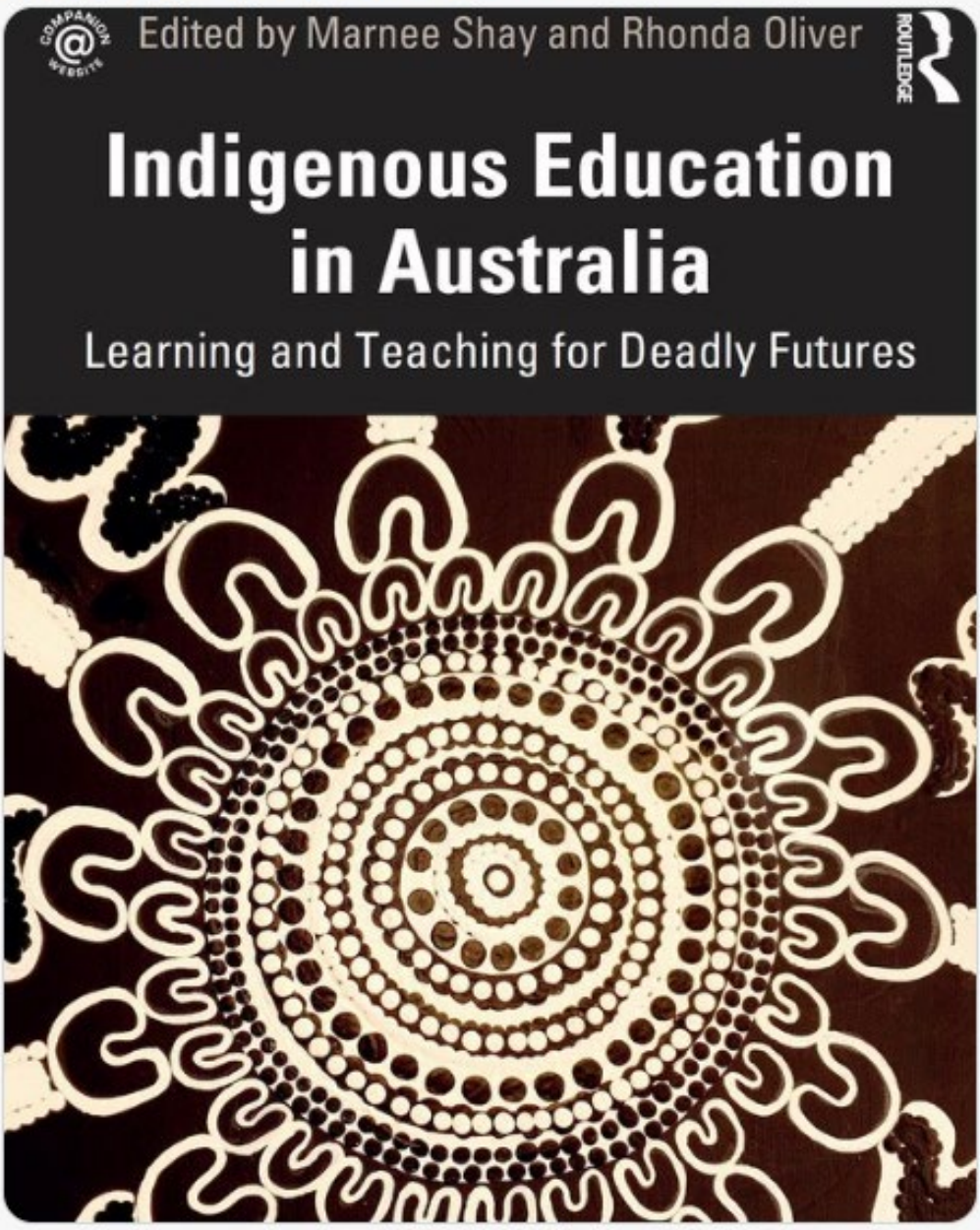
The Northern Australia Environmental Resources Hub supports sustainable development in northern Australia through world-class research. The Northern Hub is assisting decision-makers in government, Indigenous, environment, industry and community sectors to understand, use, manage and protect the north's outstanding natural assets. A key feature of the Hub's research program is collaboration with Indigenous people who own and manage land and water across the north, with research aiming to support aspirations to protect and manage country and culture and to increase jobs and wellbeing through sustainable development. The Hub is working with Indigenous people through collaborations based on respect, trust and two-way learning

You Retweeted

Stronger Smarter Institute @StrongerSmarter · Mar 23

Deadly Futures #podcast is hosted by Dr Marnee Shay & Professor Rhonda Oliver & explores different topics about #Aboriginal & Torres Strait Islander education with a diverse group of #Indigenous & non-Indigenous Elders, scholars & educators.

education.uq.edu.au/indigenous-edu...

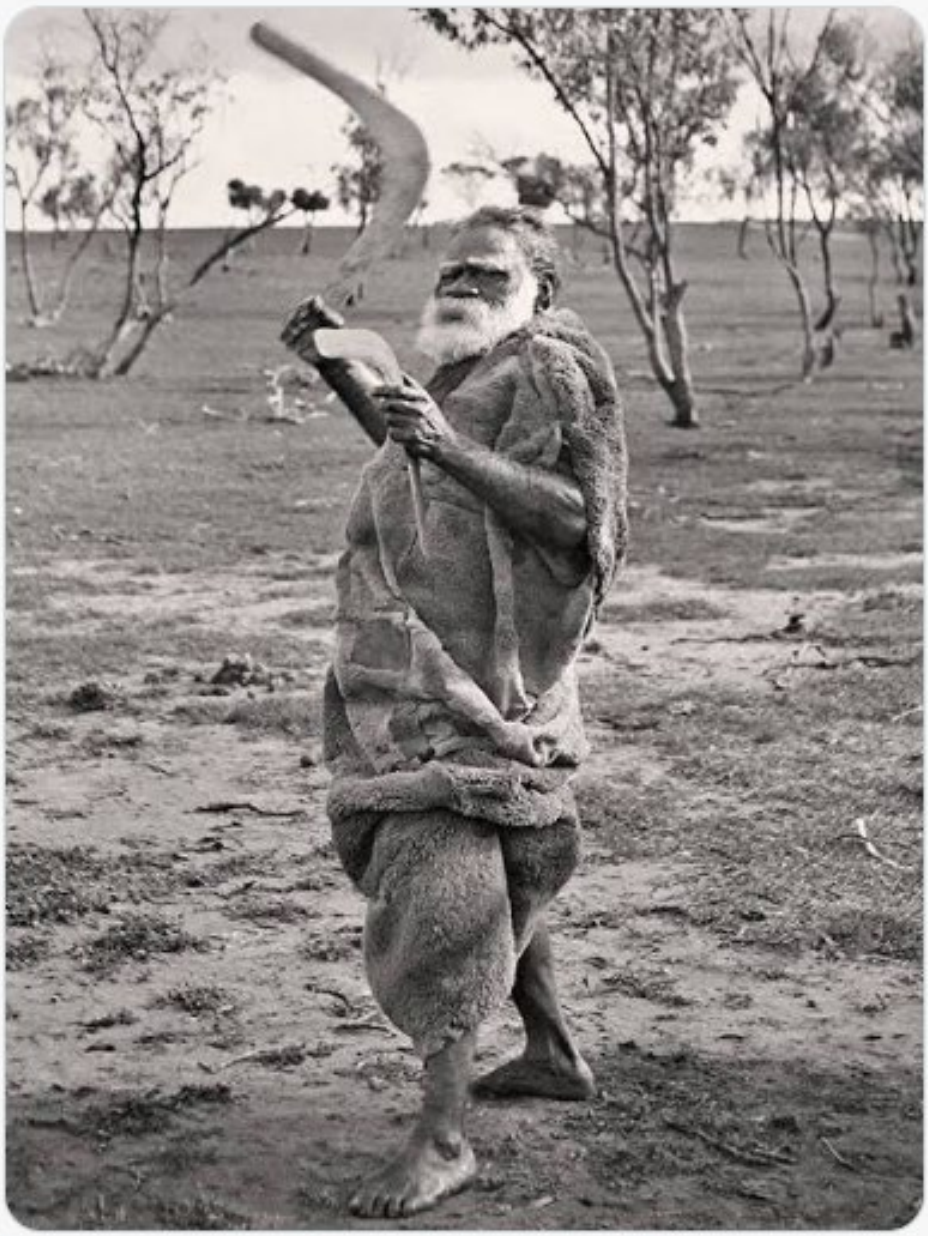


4 10

You Retweeted

Ngarra Murray @ngarra_murray · Mar 27

Our possum skin cloaks are sacred & an old tradition. Our cloaks carry a story of Country & Clan. We wore cloaks as an every day item. Worn for warmth or to carry our babies. Here is a photo of my Dja Dja Wurrung Grandfather Walpanumin wearing his cloak. Headman of the Yung Balug



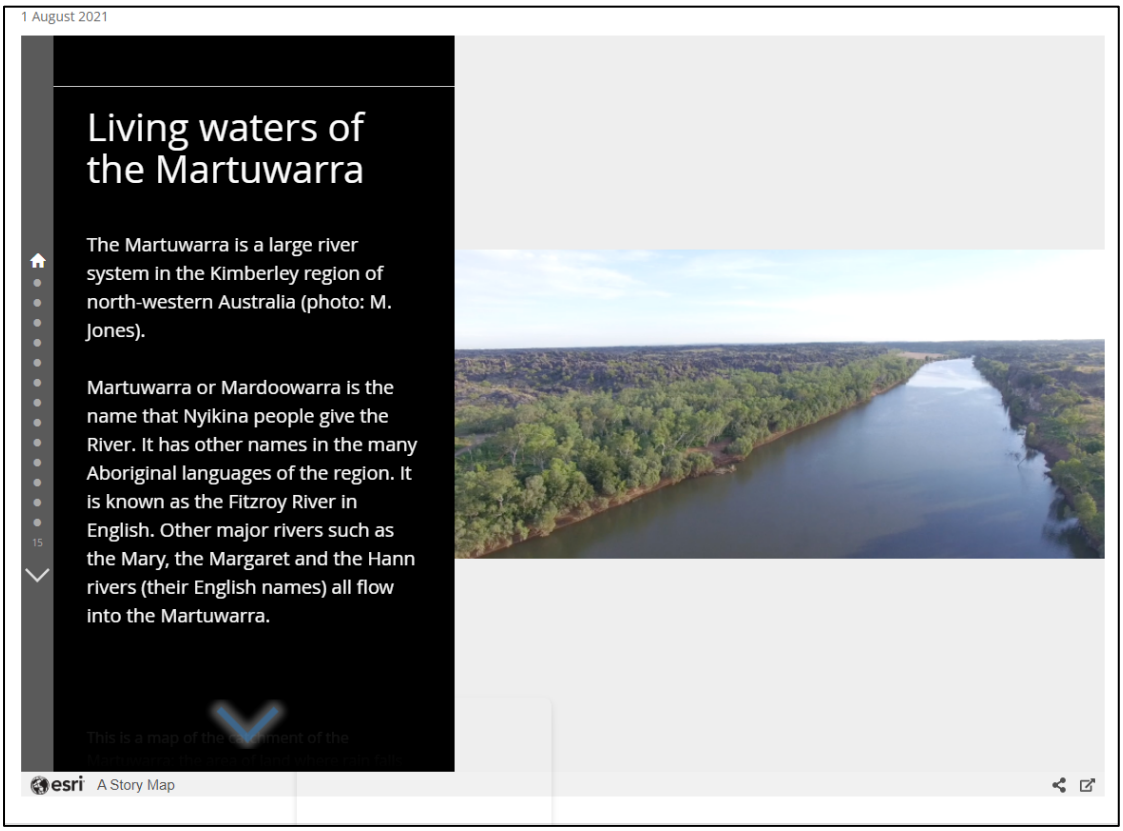
88 368 3,860

Living waters of the Martuwarra

(Northern Australia Hub newsletter, 1 Aug 2021)

Ways of knowing water

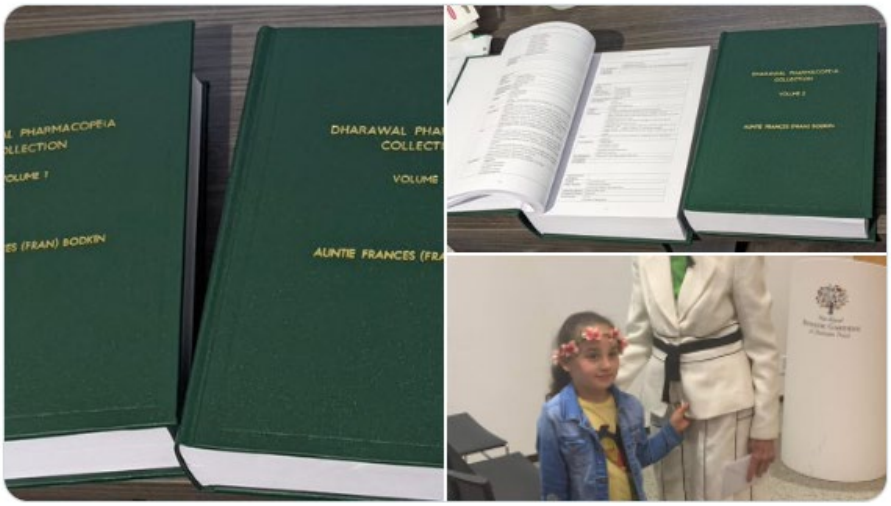
Two ways of knowing water are at play in the catchment – Traditional Owners' way, based on thousands of years of custodianship and accumulated knowledge, and another that rests on Western scientific disciplines of hydrology, ecology and economics. Like two rivers that meet (at a confluence), these two knowledge systems come from different sources. When they meet, they sometimes mix, through exchange of ideas and information, and in water policy negotiations for the future of the River and catchment.
The non-Indigenous understanding currently dominates Australian water policy. An aim of this story is to share an understanding of Traditional Owners' relationships with water, to support a stronger influence of Traditional Owners' ways of knowing and managing water.



The Bulletin of the Indigenous Science Network is distributed four times a year via email directly to members. Membership is open to all. If interested in being a part of the Network, please contact the Coordinator via email at IndigenousSciNet@yahoo.com. Issues distributed in February, May, August and November each year.

G. Bodkin-Andrews
@Gawaian77

So proud of my mother who freely gifted what is effectively her life's work, the D'harawal Pharmacopoeia (medicinal plants on D'harawal lands), to Western Sydney University for teaching, learning and research. Any emerging proceeds to go to a WSU Indigenous scholarship fund



4:56 PM · Mar 2, 2022 · Twitter for Android

178 Retweets 12 Quote Tweets 1,185 Likes

Prof Bronwyn Carlson (She/Her) @BronwynCarlson · Mar 2
Replying to @Gawaian77
your mum is so generous - what a gift ♥

9

G. Bodkin-Andrews @Gawaian77 · Mar 3
Replying to @Gawaian77
Sorry for the confusion, but the D'harawal Pharmacopoeia is not for sale. It is a free online D'harawal Knowledge resource that can be accessed through Western Sydney University Library. You may need to go through an application process to get permission to use it though.

9

Aaron Taylor @AaronTa67472031 · Mar 2
Replying to @Gawaian77
An Absolute Must 💕
Your Mum is a Genius 💗

5

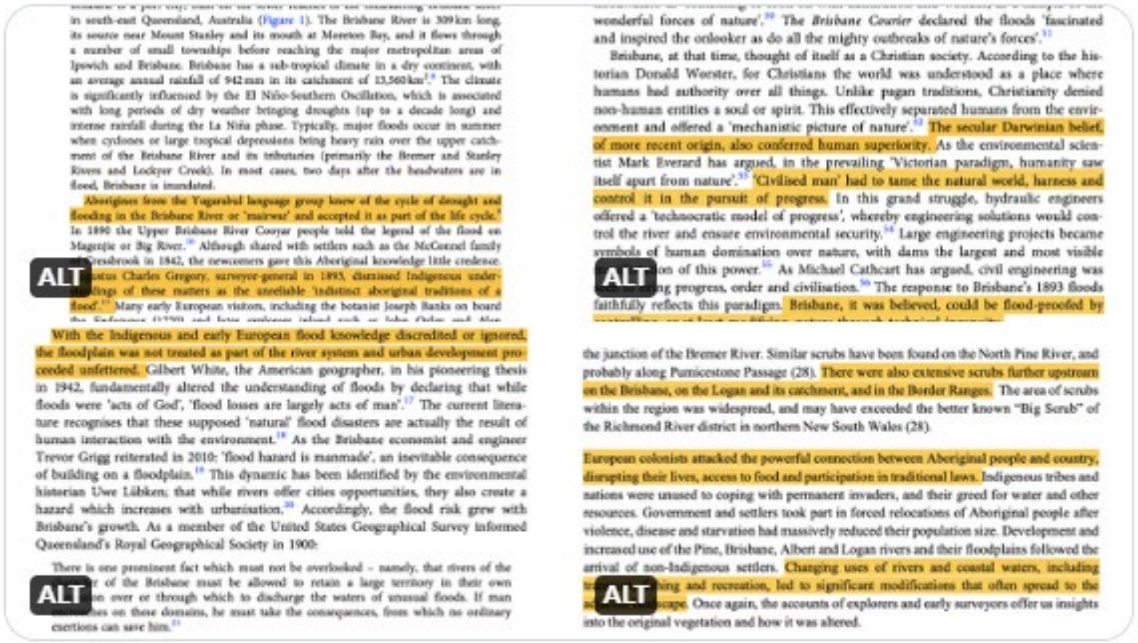
Dr G Erin go bragh (NoJusticeNoPeace) @DrGraceOBrien1 · Mar 2
Replying to @Gawaian77
What an amazing and precious gift. What an incredibly generous woman.

3

You Retweeted

Jessica
@sleepyJAK

Indigenous Peoples warned early colonisers of Meanjin/Brisbane flooding. It was part of life cycle; telling stories of floods & maintaining scrubs, mangroves to mitigate impact. Colonisers believed they were superior to the Peoples & nature so the city was built on a flood plain.



7:08 AM · Feb 27, 2022 · Twitter Web App

intense rainfall during the La Niña phase. Typically, major floods occur in summer when cyclones or large tropical depressions bring heavy rain over the upper catchment of the Brisbane River and its tributaries (primarily the Bremer and Stanley Rivers and Lockyer Creek). In most cases, two days after the headwaters are in flood, Brisbane is inundated.

Aborigines from the Yugarabul language group knew of the cycle of drought and flooding in the Brisbane River or 'mairwar' and accepted it as part of the life cycle.[9] In 1890 the Upper Brisbane River Cooyar people told the legend of the flood on Magenjie or Big River.[10] Although shared with settlers such as the McConnel family of Cressbrook in 1842, the newcomers gave this Aboriginal knowledge little credence. Augustus Charles Gregory, surveyor-general in 1893, dismissed Indigenous understandings of these matters as the unreliable 'indistinct aboriginal traditions of a flood'.[11] Many early European visitors, including the botanist Joseph Banks on board the *Endeavour* (1770) and later explorers inland such as John Oxley and Alan Cunningham (1824), had recorded evidence of floods. But this did not deter the British from setting up a penal colony right on the river, providing a port, water

Traditional bread making

(Sovereign Union, Facebook: accessed 26 April 2022) **Link**

Bread-making involved collecting seasonal grains and grinding them into flour and then dough, or directly into a dough. One of the traditional ingredients was the seeds of kangaroo grass, but many other grass species were used, depending on the region and the season. Winnowing (Separating seeds from stalks) was done by First Nations people usually using a Coolamon, a multi-purpose shallow vessel with curved sides, used to separate grains from other plant material such as stalks and debri (chalf). This involves various actions by tossing it up or dropping it. Lighter plant material is blown away in the process, while the heavier grains fall straight down. This is continued until there is enough clean seeds to grind for the required amount of bread/damper.

The grinding stones for flour, legumes, roots and nuts were often left near the places where needed and after the European invasion the settler grain growers would often find them when ploughing for their imported crops, with many of them collected as curiosities. In areas where larger boulders were more accessible, they were used for grinding grains and over the years some slowly became shaped into a bowl. Although 'grinding grooves' were used for grain, many others shapes were used for grinding spear and axe heads. Grinding Grooves (pictured right) can still be found right across the continent (because they are harder to steal).

"Indigi-Genius" and Native Science

(Devin D. O'Leary, Lakota Times: 3 Mar 2022)

The short-form series is written and hosted by Dr. Lee Francis IV (Pueblo of Laguna), a self-described "Indigi-nerd," *Supplied*

Living in New Mexico, most of us are well-versed in Native American art and culture. But how much do we know about traditional Indigenous science? Chances are, not a lot. Last week NMPBS premiered the first episode of its locally produced, locally lensed science series "Indigi Genius." The online series, which will be streaming new episodes every other week on the New Mexico PBS website, explores the history of traditional Native American technology. Through the lens of modern science, viewers are shown what remarkable advances the ancient American peoples made. Among the topics rolling out in this first season of "Indigi-Genius" are adobe bricks, preserved jerky, cosmetics and baby carriers — innovations which are still in use today.

Plotting out the episodes and topics was a collaborative effort. "We all just threw ideas out there to figure what we wanted to discuss," recalls host Dr. Lee Francis. "We wanted to make sure that we had a broad range of topics and covered a wide geographical area of Indigeneity. We also wanted to fold in more than just 'hard' sciences and included engineering, technology and innovations as some of our topic themes." The pilot episode of "Indigi-Genius," for example, explores the traditional Native American food staple of blue corn mush. There's a surprising amount of science hiding behind this humble dish, and Francis spends the episode explaining how ingredients like blue corn and juniper ash interact chemically to produce a healthy and nutritious food staple.

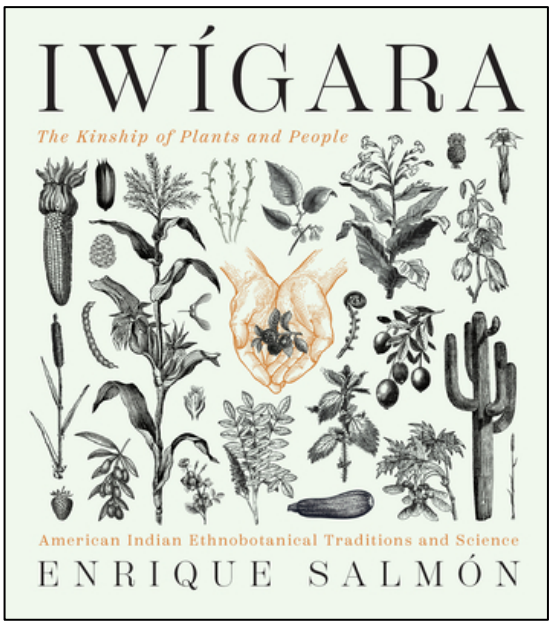
Remarkable Indigenous Scientists and Researchers

(John Boyko, The Canadian Encyclopedia: 28 Apr 2022)

Research and science are about posing new questions to seek better ways of thinking, healing and understanding. Among those advancing science and research in Canada, while incorporating Indigenous beliefs, are these remarkable people:

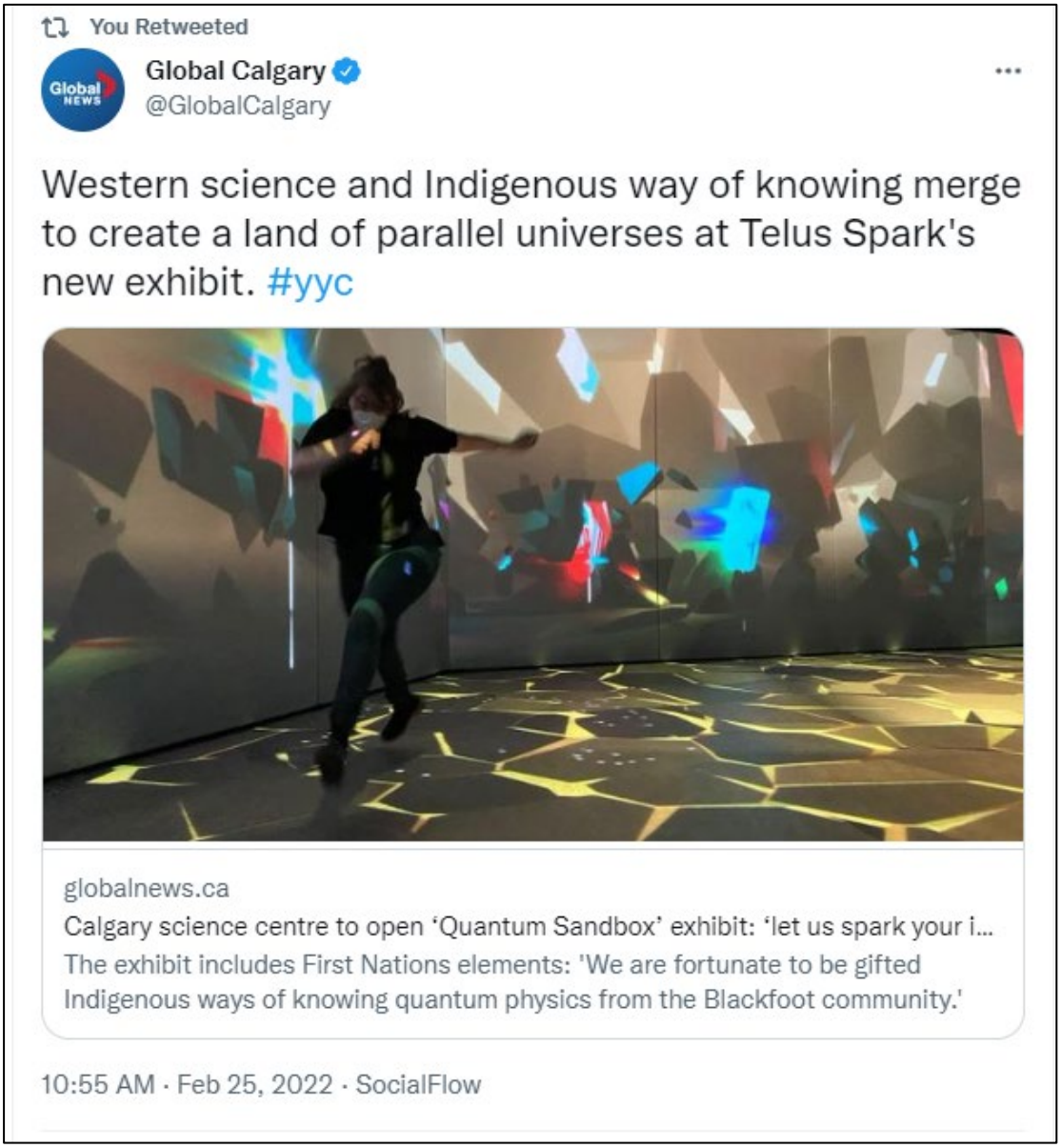
ARTICLE INDEX

Iwígara: American Indian Ethnobotanical Traditions and Science (Hardcover)
(Enrique Salmón, Publisher: Timber Press, Publication Date: September 15th, 2020)



A beautiful catalogue of 80 plants, revered by indigenous people for their nourishing, healing, and symbolic properties. — Gardens Illustrated

The belief that all life-forms are interconnected and share the same breath—known in the Rarámuri tribe as iwígara—has resulted in a treasury of knowledge about the natural world, passed down for millennia by native cultures. Ethnobotanist Enrique Salmón builds on this concept of connection and highlights 80 plants revered by North America's indigenous peoples. Salmón teaches us the ways plants are used as food and medicine, the details of their identification and harvest, their important health benefits, plus their role in traditional stories and myths. Discover in these pages how the timeless wisdom of iwígara can enhance your own kinship with the natural world.



Indigenous Science

Indigenous Science and Technology Studies, Governance, and Decolonization - 2021 Rolf Buchdahl Lecture ***(Dr Kim Tall Bear, University oif Albert: 10 Mar 2021)***

Like traditional Science and Technology Studies, the new field of Indigenous STS studies the cultures, politics, and histories of non-Indigenous science and technology efforts. In addition, it studies Indigenous-led science and technology, including knowledges classified as "traditional." Indigenous STS refuses the purported divide between scientific and Indigenous knowledges, yet it does not conflate knowledge traditions. It understands them as potentially sharing methods while deriving in practice from different worldviews.

Indigenous STS—comprised of mostly Indigenous thinkers trained and working in a variety of disciplines and applied fields—also focuses on science and technology knowledge production for social change (since technoscience has long been integral to colonialism). Indigenous STS works with scientists and those in technology fields to change fields from within. Some Indigenous STS scholars are practicing scientists. After discussing Indigenous STS foundations and goals, this talk showcases the Summer internship for INdigenous peoples in Genomics (SING), a training program founded in 2011 in the US. SING has since expanded to Aotearoa/New Zealand, Canada, and Australia in conjunction with Indigenous STS efforts to support global Indigenous governance via science and technology.

You Retweeted

Dr. Kisha Supernant (she/her)
@ArchaeoMapper

"Non-Indigenous scientists felt the need to evaluate whether the clothing invented and worn by Indigenous people who have lived in cold climates for thousands of years actually worked to keep them warm."

Of course it is effective. Why was this even a question??

Ove Poulsen @ove_poulsen · Feb 4
We could have told them

Up Here Magazine
@upheremag

Scientists found the traditional clothing system used over centuries by Inuit is the most effective cold weather clothing developed to date. buff.ly/36qX5Hf

8:15 AM · Feb 5, 2022 · Twitter Web App

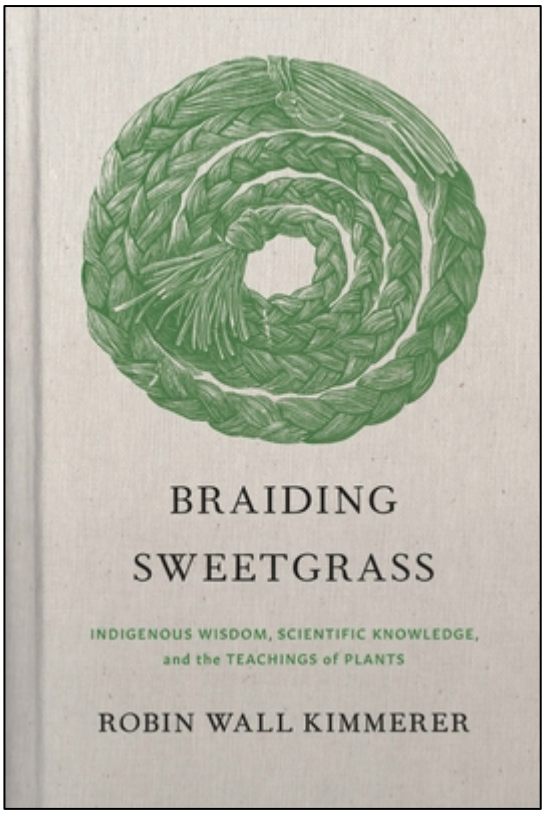
Kelsey Timler @campfirekelsey · Feb 5
Replying to @ove_poulsen
White scientists figure out something that Indigenous Peoples have known for centuries: Part 1 million and counting

2 1 25

ISN members are encouraged to submit items exploring any aspects of Indigenous science teaching or education. As the Bulletin is not an official journal or organ of any recognised institution, we are not required to enforce any formatting, editing or reviewing regimes. We do have an Advisory Board made up of eight First Nations Co-Editors who view all items before publication. If you are doing something valuable in Indigenous science, teaching or education, please consider telling your story here!

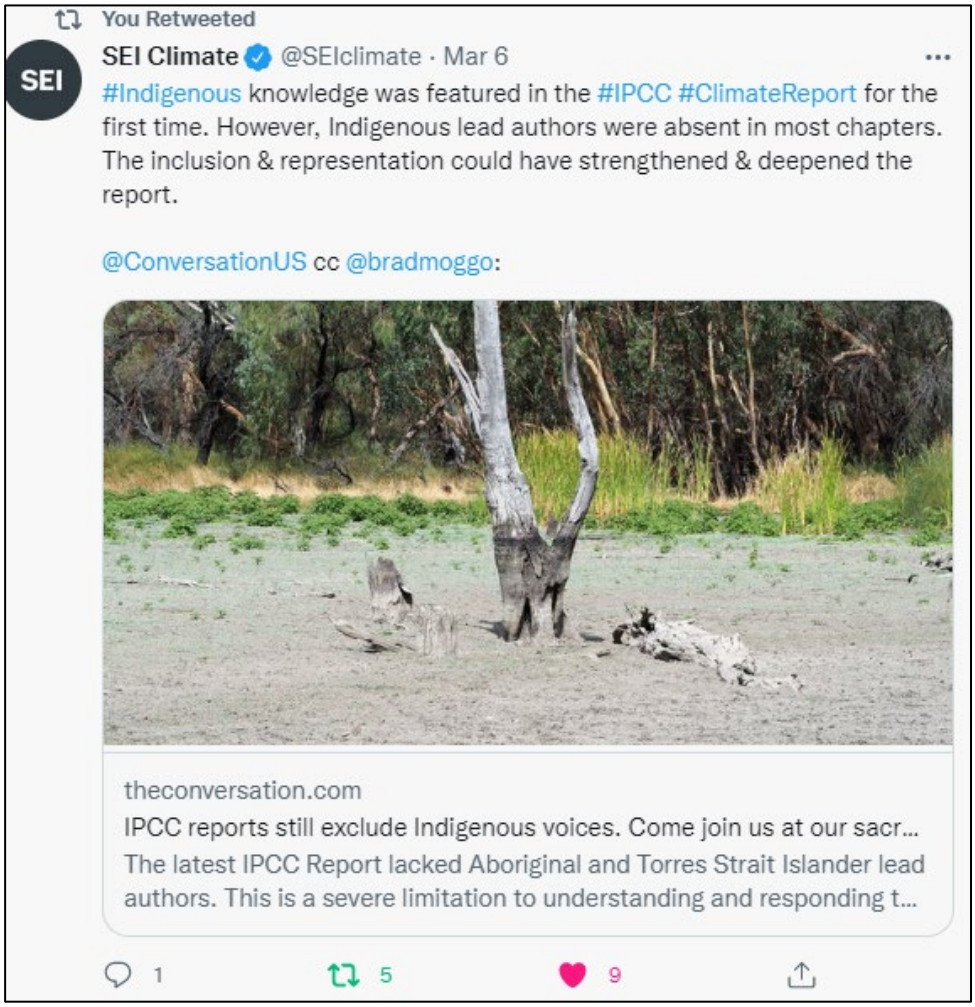
Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants (Hardcover)

(Robin Wall Kimmerer, Publisher: Milkweed Editions, Publication Date: October 13th, 2020)



As a botanist, Robin Wall Kimmerer has been trained to ask questions of nature with the tools of science. As a member of the Citizen Potawatomi Nation, she embraces the notion that plants and animals are our oldest teachers. In Braiding Sweetgrass, Kimmerer brings these two lenses of knowledge together to take us on "a journey that is every bit as mythic as it is scientific, as sacred as it is historical, as clever as it is wise" (Elizabeth Gilbert). Drawing on her life as an indigenous scientist, and as a woman, Kimmerer shows how other living beings--asters and goldenrod, strawberries and squash, salamanders, algae, and sweetgrass--offer us gifts and lessons, even if we've forgotten how to hear their voices. In reflections that range from the creation of Turtle Island to the forces that threaten its flourishing today, she circles toward a central argument: that the awakening of ecological consciousness requires the acknowledgment and celebration of our reciprocal relationship with the rest of the living world. For only when we can hear the languages of other beings will we be capable of understanding the generosity of the earth, and learn to give our own gifts in return

Indigenous Science Network



PAPERS

Comparing constellations across cultures *(Charles Kemp, Duane W. Hamacher, Daniel R. Little & Simon J. Cropper: Nature Astronomy, Vol 6, pgs 406–409 (2022)* Link

Cultural astronomy reveals ways in which perception and culture have shaped the interpretation of the night sky.

ABSTRACT
Cultures around the world organize stars into constellations, or asterisms, and these groupings are often considered to be arbitrary and culture specific. Yet there are striking similarities in asterisms across cultures, and groupings such as Orion, the Big Dipper, the Pleiades, and the Southern Cross are widely recognized across many different cultures. Psychologists have informally suggested that these shared patterns are explained by Gestalt laws of grouping, but there have been no systematic attempts to catalog asterisms that recur across cultures or to explain the perceptual basis of these groupings. Here, we compiled data from 27 cultures around the world and found that a simple computational model of perceptual grouping accounts for many of the recurring cross-cultural asterisms. Our results suggest that basic perceptual principles account for more of the structure of asterisms across cultures than previously acknowledged and highlight ways in which specific cultures depart from this shared baseline.

Cultural identity central to Native American persistence in science

(Nizhoni Chow-Garcia, Naomi Lee, Vanessa Svihla, Claira Sohn, Scott Willie, Maija Holsti & Angela Wandinger-Ness: Cultural Studies of Science Education (2022): Published 29 Jan 2022) Link

ABSTRACT

Native Americans are the least represented population in science fields. In recent years, undergraduate and graduate level summer research programs that aimed to increase the number of Native Americans in science have made some progress. As new programs are designed, key characteristics that address science self-efficacy and science identity and provide supports for Native American students' commitment to a scientific career should be considered. In this study, we used sequential mixed methods to investigate the potential of culturally tailored internship programs on Native American persistence in science.

We analyzed surveys (n = 47) and interviews (n = 4) with Native American students to understand their perceptions of themselves in relation to science research and how summer research experiences might develop science identities. Based on regression modeling, science identity, but not science self-efficacy, predicted intent to persist in science. In turn, science self-efficacy and Native American identity predicted science identity, and this suggests cultural identity is central to Native American persistence in science. In interviews, students' comments reinforced these findings and shed light on students' reasoning about the kinds of science experiences they sought; specifically, they chose to participate in culturally tailored internships because these programs provided a sense of belonging to the scientific community that did not conflict with their cultural identities. Based on our analysis, we propose an Indigenous science internship model and recommend that agencies target funding for culturally tailored programs from high school through early-investigator levels as well as provide inclusive programmatic and mentoring guidelines.

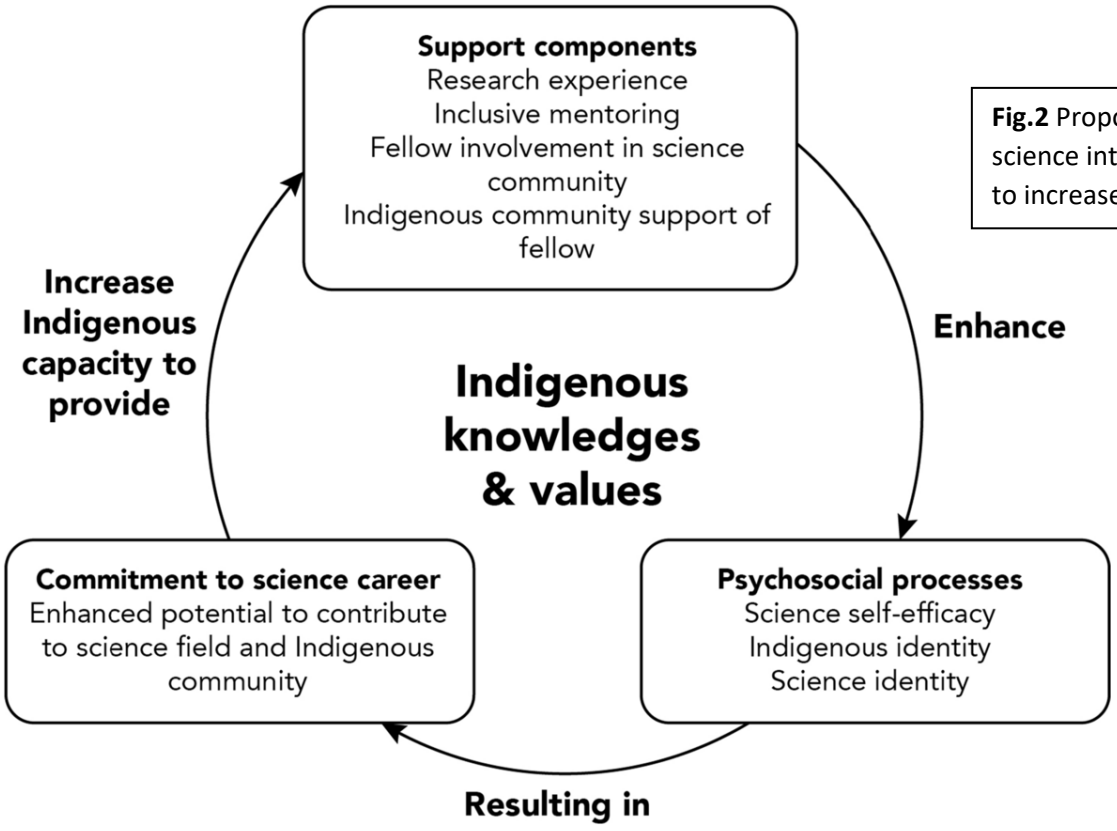


Fig.2 Proposed Indigenous science internship model (ISIM) to increase Natives in science.

Indigenous research methodologies in water management: learning from Australia and New Zealand for application on Kamilaroi country Link

(Bradley J. Moggridge, Ross M. Thompson & Peter Radoll, Wetlands Ecology and Management (2022))

ABSTRACT

Indigenous Research Methodologies (IRMs) for considering cultural values of water are a missing component of water and wetlands management in Australia. On this dry, flat and ancient continent Traditional Knowledge has been passed on from generation to generation for millennia. The profound knowledge of surface and groundwater has been critical to ensuring the survival of Indigenous peoples in the driest inhabited continent, through finding, re-finding and protecting water. Indigenous Research Methodologies can provide a basis for the exploration of this knowledge in a way that that is culturally appropriate, and which generates a culturally safe space for Indigenous researchers and communities. The development of IRMs has been and continues to be limited in Australia in the water context, primarily due to the lack of Indigenous water practitioners, with non-Indigenous researchers dominating the sector.

The intention of the paper is to shift and decolonise the research paradigm from studying Indigenous peoples through non-Indigenous research methodologies, to partnering in developing methods appropriate to Indigenous knowledge systems. Indigenous Research Methodologies are rooted in Indigenous epistemologies and ontologies and represent a radical departure from more positivist forms of research (Wilson, Can J Native Educ 25:2, 2001). This allows the Indigenous researcher to derive the terms, questions, and priorities of what is being researched, how the community is engaged, and how the research is delivered. This paper provides an overview of Indigenous engagement in water management in Australia and Aotearoa (New Zealand), with reference to case studies. These more general models are used as the basis for developing an IRM appropriate to the Kamilaroi people in the Gwydir Wetlands of northern NSW, Australia. as biodiversity conservation decision-makers and managers at national and international levels.

FIG. 1 Kamilaroi painting of a Thagaay, Golden Perch or Yellow Belly *(Moggridge 2004)*

Call for Indigenous Contributions to Molecular Ecology

(Edited by: Drs. Seafha Ramos (Yurok/Karuk), Andrew Kinziger, and Alana Alexander (Māori/Pākehā): Deadline for initial submission of full papers: 9 September 2022) **Link**

Molecular Ecology Resources welcomes original articles, primary research, opinions and perspectives for an upcoming Special Issue, *Indigenous Contributions to Molecular Ecology*. To submit a manuscript for consideration in this Special Issue, please follow the author guidelines.

SCOPE STATEMENT

Barriers and marginalization based on the identities of Indigenous peoples exist at every stage of the academic ladder. Indigenous peoples face many challenges within Molecular Ecology, including racism, fewer same-community role models, and a lower overall sense of belonging. It is well-established that increased diversity results in a greater problem-solving ability and more novel research. It is critical that we dismantle barriers faced by marginalized people because of their ethnicity or race to stem the loss of diverse talent, and to elevate and support Indigenous people within Molecular Ecology.

This special issue has the following goals: 1) highlight and promote the work of Indigenous scientists in the field of molecular ecology in a major scientific journal, supporting career advancement by alleviating potential hurdles such as unconscious bias in the publication process; 2) spotlight Indigenous role models from around the world for people of all backgrounds, education levels, and career levels, especially Indigenous peoples pursuing science degrees and careers; 3) contribute to the scientific literature on molecular ecology; 4) place explicit value on Indigenous Research Methodologies and Traditional Ecological Knowledge (TEK) as important to Indigenous communities and scientists in the research process. We seek contributions from all around the world.

The Bulletin of the Indigenous Science Network is distributed four times a year via email directly to members. Membership is open to all. If interested in being a part of the Network, please contact the Coordinator via email at IndigenousSciNet@yahoo.com. Issues distributed in February, May, August and November each year.

Legacies of Indigenous land use and cultural burning in the Bolivian Amazon rainforest ecotone ***(S. Yoshi Maezumi, Sarah Elliott, Mark Robinson, Carla Jaimes Betancourt, Jonas Gregorio de Souza, Daiana Alves, Mark Grosvenor, Lautaro Hilbert, Dunia H. Urrego, William D. Gosling and José Iriarte, The Royal Society: Published 7 March 2022)*** Link

ABSTRACT

The southwestern Amazon Rainforest Ecotone (ARE) is the transitional landscape between the tropical forest and seasonally flooded savannahs of the Bolivian Llanos de Moxos. These heterogeneous landscapes harbour high levels of biodiversity and some of the earliest records of human occupation and plant domestication in Amazonia. While persistent Indigenous legacies have been demonstrated elsewhere in the Amazon, it is unclear how past human–environment interactions may have shaped vegetation composition and structure in the ARE.

Here, we examine 6000 years of archaeological and palaeoecological data from Laguna Versalles (LV), Bolivia. LV was dominated by stable rainforest vegetation throughout the Holocene. Maize cultivation and cultural burning are present after ca 5700 cal yr BP. Polyculture cultivation of maize, manioc and leren after ca 3400 cal yr BP predates the formation of Amazonian Dark/Brown Earth (ADE/ABE) soils (approx. 2400 cal yr BP). ADE/ABE formation is associated with agroforestry indicated by increased edible palms, including Mauritia flexuosa and Attalea sp., and record levels of burning, suggesting that fire played an important role in agroforestry practices.

The frequent use of fire altered ADE/ABD forest composition and structure by controlling ignitions, decreasing fuel loads and increasing the abundance of plants preferred by humans. Cultural burning and polyculture agroforestry provided a stable subsistence strategy that persisted despite pronounced climate change and cultural transformations and has an enduring legacy in ADE/ABE forests in the ARE. This article is part of the theme issue 'Tropical forests in the deep human past'.

INDIGENOUS ASTRONOMY

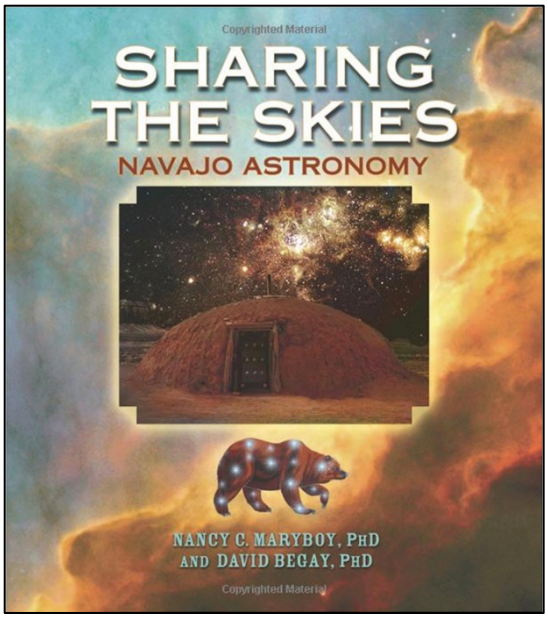
Sharing the Skies - Preserving Ancient Native American Knowledge for Future Generations

(accessed 15 April 2022) **Link**

A website of native American astronomy which contains links to the following resources:

Navajo Skies – Planetarium Show: A full-dome, animated star show, which is also rendered for flat-screens. 40 minutes of Navajo Astronomy stories told in Navajo and English.

Dine (Navajo) Universe. A full color poster of the Navajo sky with Navajo/English names and locations of Navajo constellations.



Stars Over Diné Bikéyah (Stars Over Navajoland): Winter Stories of the Navajo Constellations. A CD / MP3 of music and story, featuring the origins and values of the Navajo constellations, as told by elders to families in a traditional Hogan setting.

Sharing the Skies: Navajo Astronomy, A Cross-Cultural View, by Nancy C. Maryboy Ph.D. and David Begay, Ph.D. In this book you will find an introduction to the Navajo Universe, stories of the Navajo night skies, an introduction to Greek Astronomy, an introduction to space science, full color paintings of Navajo constellations images from the Hubble telescope and engaging education activities.

Seeing the skies through Navajo Eyes

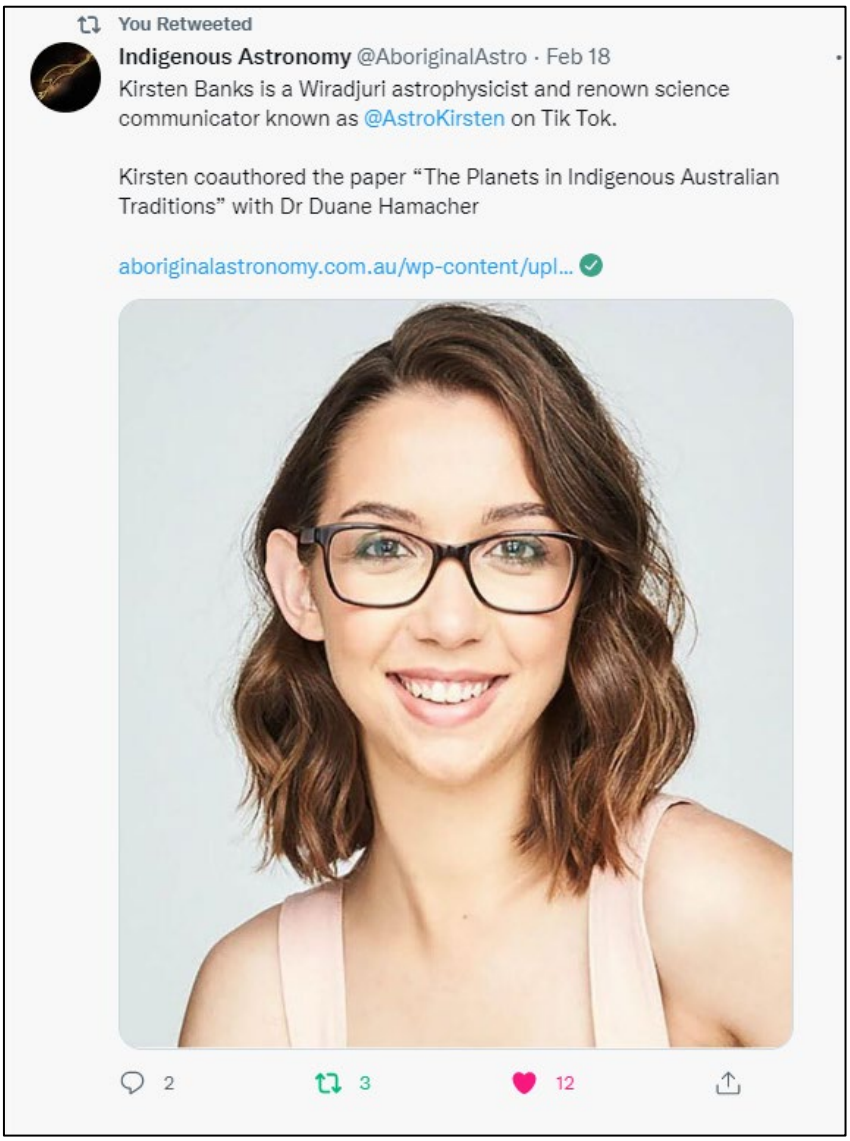
(Dr. David Begay and Dr. Nancy Maryboy: 13 Jun 2021)

Decolonising the Search for Extraterrestrial Life

(Doug Johnson, The Wire: 6 April 2022)

Conceptions of outer space have long been rooted in colonialism. The term “Manifest Destiny,” for example, was coined in 1845 by a journalist arguing for the inevitable expansion of the US across North America — an effort that ultimately resulted in the death and forced migration of tens of thousands of Native Americans, if not more. The language of expansion, frontiers, and conquest reflects a long history of settlers taking Indigenous land and trying to eliminate Indigenous cultures; therefore, these scholars say, this rhetoric and way of thinking should be scrutinised when applied to efforts to reach outer space.

The antennas of the Atacama Large Millimeter /submillimeter Array (ALMA), in northern Chile, under the southern sky. *Photo: ESO/B/ Tafreshi (www.twanight.org/)*

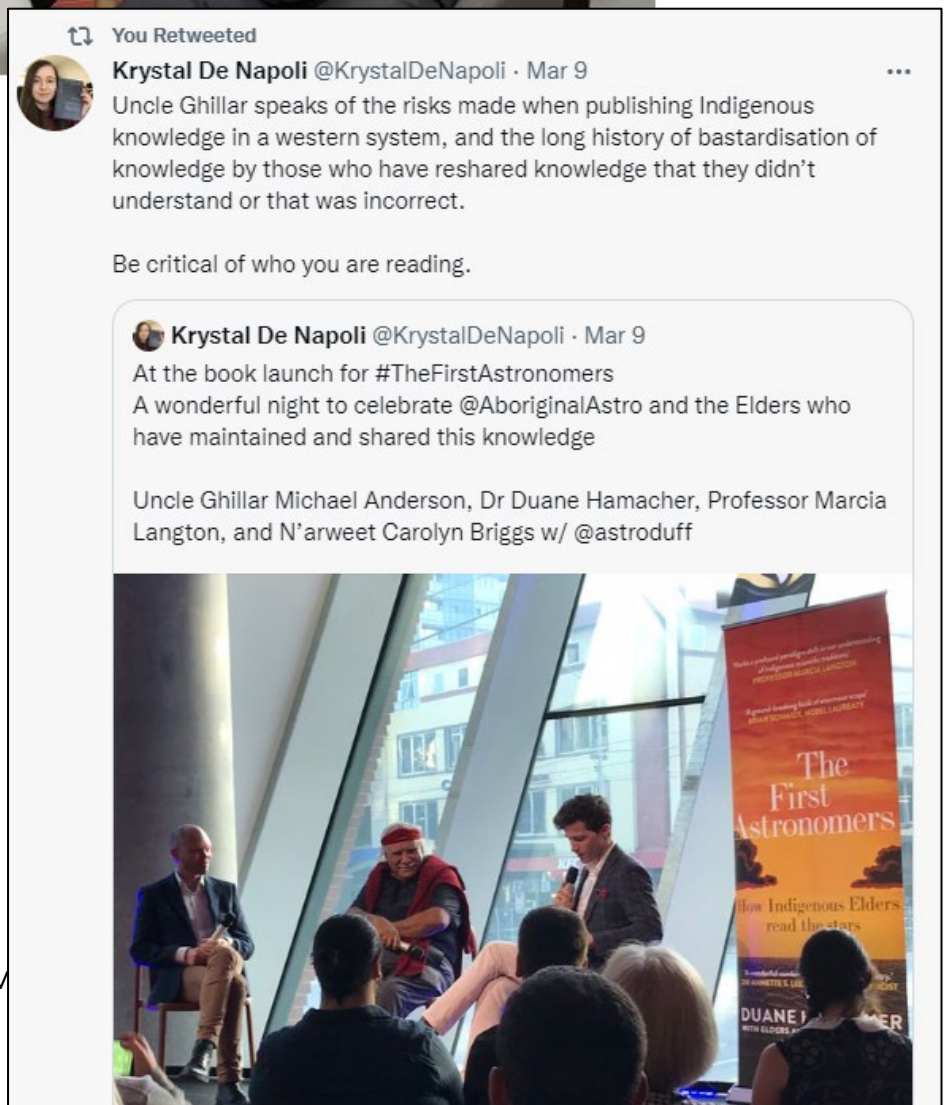


The First Astronomers: A Conversation with Uncle Ghillar Michael Anderson

(Indigenous Knowledge Institute, Melbourne University: 10 Mar 2022)

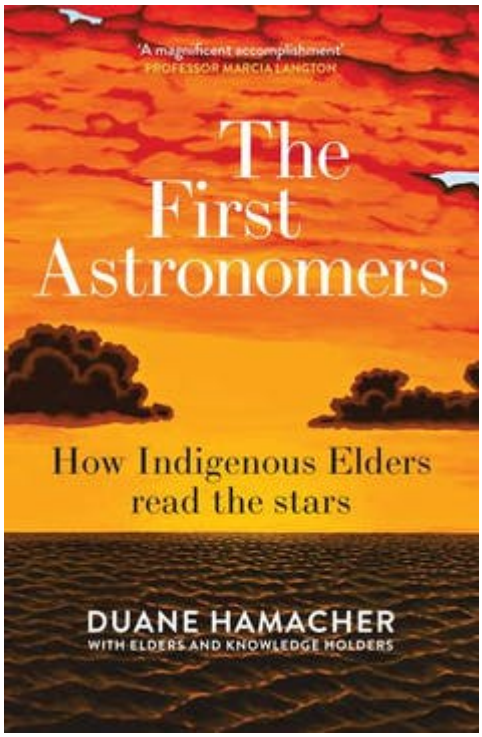
Drawing on the recently released book 'The First Astronomers: How Indigenous Elders read the stars', Uncle Ghillar and lead author Duane Hamacher are filmed discussing Indigenous sky knowledge. First Nations Elders are expert observers of the stars. They teach that everything on the land is reflected in the sky, and everything in the sky is reflected on the land. These living systems of knowledge challenge conventional ideas about the nature of science and the longevity of oral tradition. Indigenous science is dynamic, adapting to changes in the skies and on Earth, pointing the way for a world facing the profound disruptions of climate change. "This book marks a profound paradigm shift in our understanding of Indigenous scientific traditions, how they are transmitted, and their relevance to life today." - Professor Marcia Langton, University of Melbourne.

The recording of the **The First Astronomers: A Conversation** with Uncle Ghillar Michael Anderson and N'arweet Dr Carolyn Briggs can now be watched online.



Supernovas, auroral sounds and hungry tides: unpacking First Nations knowledge of the skies ***(Mirani Litster, James Cook University, The Conversation: 29 Mar 2022)***

First Nations people have been observing the skies for millennia. This book recognises that Indigenous and Western ways of knowing can work together. Indigenous astronomy has often challenged Western scientific knowledge, motivating further scientific inquiry. For example, auroras have long been witnessed by First Nations people, both in high latitudes near the Arctic and low latitudes in Aoteoroa/New Zealand and Australia. First Nations people have reported auroras sounding like "rustling grass, or a person walking through snow". Sámi – the indigenous people of the northernmost parts of Sweden, Finland and Norway – refer to auroras as guovssahas, meaning "the light you can hear". The Western scientific community was dismissive of these "auroral sounds". But in 2016 a group of Finnish scientists, guided by Sámi and Inuit traditions, confirmed that they exist.



Duane Hamacher's *The First Astronomers* explores the deep and living star knowledge of First Nations people from around the world – and challenges the notion that Indigenous knowledge is not scientific. This magnificent book is the latest in a growing body of work showcasing Indigenous knowledge of the natural world. It follows other popular texts, including Bill Gammage's *The Biggest Estate on Earth* (2011), Bruce Pascoe's widely debated and important *Dark Emu* (2014), *Australia's First Naturalists* (2019) by Penny Olsen and Lynette Russell, and the *First Knowledges* series edited by Margo Neale. Astrophysicist Hamacher has been guided by Elders and Knowledge Holders Ghillar Michael Anderson, Segar Passi, John Barsa, David Bosun, Ron Day and Alo Tapim.

You Retweeted

Indigenous Astronomy @AboriginalAstro · Mar 22

#Meriam people of the eastern #TorresStrait tell about 'purut', a time for family to sleep on the beach under the clear skies where they tell star stories.

Artwork: 'Our Culture is Important' (2012) by Dauareb Elder Segar Passi / Gab Tutui

1

You Retweeted

Indigenous Astronomy @AboriginalAstro · Mar 22

In the western Torres Strait, the #astronomer is called a Zugubau Mabaig, literally meaning “Star Person”.

They go through an initial training period of seven years at the kwod – a place of law & learning.

Artwork: Zugubau Mabaig (2008) by Mualgal artist David Bosun / Mua Arts

1 3 13

Review of Aboriginal astronomy and navigation: A Western Australian focus

(Patricia A. Forster, Cambridge University Press on behalf of the Astronomical Society of Australia: 27 dec 2021) **Link**

ABSTRACT

This review of Aboriginal astronomy and navigation brings together accounts from widely dispersed places in Western Australia, from Noongar Country in the south-west, through to the Eastern Goldfields, the Pilbara, the Kimberley and the Central Deserts. Information for this review has been taken from the literature and non-conventional sources, including artist statements of paintings. The intention for the review is that the scope is traditional, pre-European settlement understandings, but post-settlement records of oral accounts, and later articulation by Aboriginal peoples, are necessarily relied upon. In large part, the Western Australian accounts reflect understandings reported for other states. For example, star maps were used for teaching routes on the ground, but available accounts do not evidence that star maps were used in real-time navigation. The narratives or dreamings that differ most from those of other states explain creation of night-sky objects and landforms on Earth, events including thunder, or they address social behaviour.

Bi-monthly Cultural Astronomy Forum

(Ray Norris, School of Science, Western Sydney University & CSIRO Space & Astronomy: via email 27 Apr 2022)

I would like to highlight an excellent new review of Western Australian Indigenous Astronomy, written by Pat Forster. Although much has been written on Indigenous astronomy in the eastern half of the country, relatively little has been written about WA astronomy. Pat does an excellent job in pulling together all the threads, producing a comprehensive review. It is on https://doi.org/10.1017/pasa.2021.51

I would also like to advertise a bi-monthly Cultural Astronomy Forum, held on zoom. No registration is required - you just turn up. Our next seminar is on 6 May, when the speaker will be Duane Hamacher talking about "Exploring the influence of meteors on culture and society". Details are on http://ocaf.pbworks.com/

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Australian Indigenous Astronomy
March 24 ·

Today we want to introduce you to Dr Stacy Mader - Australia's only PhD-qualified Aboriginal astrophysicist. Stacy is a Gidja man originally from Wyndham in the Kimberley region of far northern Western Australia

Stacy is a radio astronomer with the CSIRO and works at Parkes Observatory. He is a Senior Experimental Scientist and supports astronomical observations, spacecraft tracking and observations with the SKA Pathfinder.

He earned a BSc(Hons) in physics from The University of Western Australia in Perth in 1993. He resided at the Shenton House and was one of only 30 Aboriginal students enrolled at UWA at that time.

After attending the World Indigenous People's Conference on Education at Wollongong in 1993, he decided to move to the UOW: University of Wollongong, Australia where he completed a Master of Science (with Honours) in 1995 and PhD in astrophysics in 2001.

His 2001 PhD thesis was titled "Giant Herbig-Haro Flows: Identification And Consequences" which involved studying outflows in star-forming regions. He received the @nasa Group Achievement Award in 2003, 2013, and 2019 and the CSIRO Chairman's Medal in 2015.

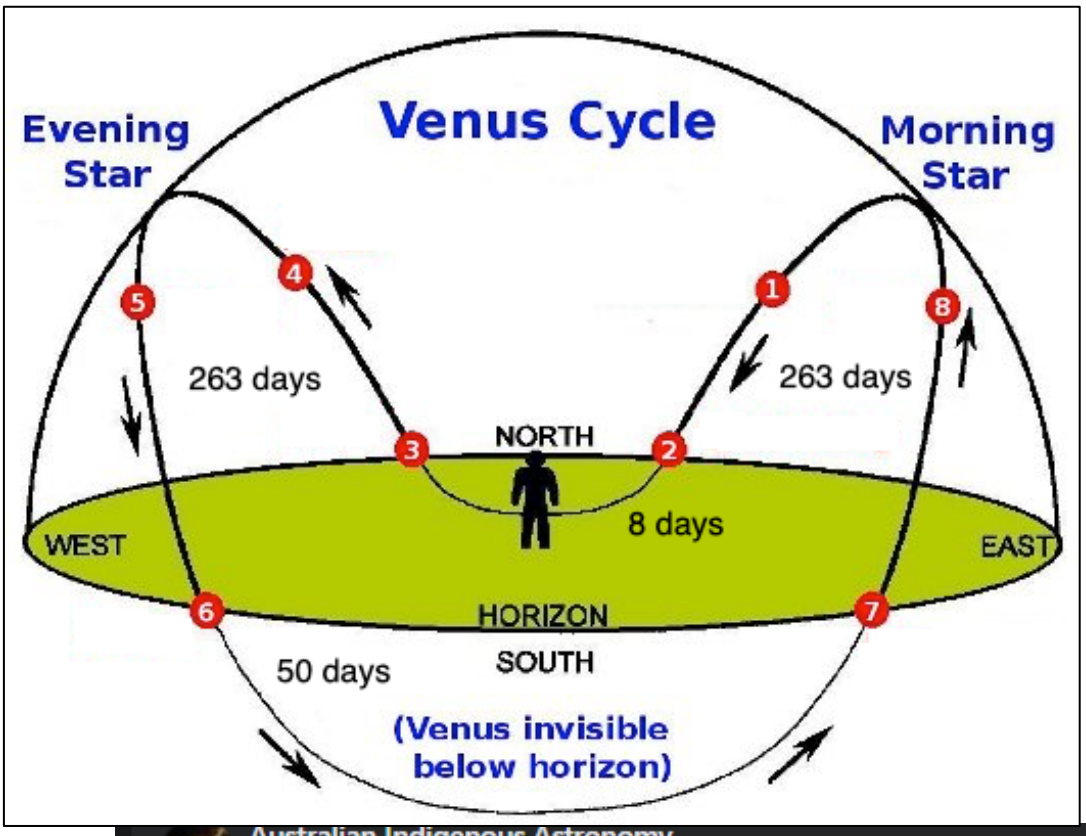
Stacy conducts STEM outreach to schools in regional NSW, including school visits, project based learning & tours of the Parkes Radio telescope.

He is active in Indigenous Astronomy and is a Board Director of the Australian Association for Astronomy in Culture (AAAC) - a charity for research, scholarships, and community programs in astronomy.

He was involved in the 64-metre Parkes Radio Telescope being renamed Murriyang, a Wiradjuri word meaning 'skyworld'. The 18m decommissioned antenna is named 'Giyalung Guluman'. The 12m ASKAP testing antenna is named 'Giyalung Miil', meaning 'Smart Eye'.

You can listen to Krystal De Napoli interview Stacy for an hour on the Indigenuity program on Triple R - 3RRR 102.7FM back on 4 October 2021.

https://www.rrr.org.au/.../17797-indigenuity-4-october-2021



Australian Indigenous Astronomy
March 28 ·

The cycles of #Venus and links to ceremony - the science of Indigenous Planet Knowledge

Warning: names and images of people who have passed away

Aboriginal Australians closely observe motions of the planets to such a degree they know where they would appear and what they would look like in the sky even on nights you cannot see them.

Yolngu people long ago worked out the 584 day synodic period of Venus, calculating the number of days it would appear as a Morning or Evening Star. The #Banumbirr ceremony, which occurs when Venus rises as a Morning Star, requires advanced preparation and planning.

Banumbirr ceremony guides spirits to Barralku, the island of the dead. The people describe the planet setting as an EveningStar before rising 8 days later as a MorningStar, which is the final stage of the planet's Synodic Period.

The planet's synodic period sees it visible as a Morning Star for 263 days, then disappearing below the horizon for 50 days. It reappears as an Evening Star for 263 days, before disappearing yet again. It returns 8 days later as a Morning Star. Total cycle is 584 days.

The planet goes through 5 unique synodic cycles that repeat every 8 years. Each of these 5 cycles is called an 'apparition'. This occurs is because the orbits of Venus and Earth around the Sun are in 5:8 resonance.

5:8 resonance means that for every five times the Earth goes around the Sun, Venus goes around 8 times. If you map out a line connecting their relative orbits, it traces out a Pentagrammic pattern.

Yolngu traditions describe Banumbirr (Venus) being attached to the Sun by a white rope, which pulls it back down to Earth after it ascends into the sky. The ceremonial Morning Star Poles feature white feathers.

Morning Star Poles feature prominently in ceremony. One of the last custodians of this tradition was Malu Gurruwiwi (1942-2020), a Yolngu man of the Galpu & Djapu Clans.

"It was very important to my father that I know the story of Banumbirr. He was the last from all the clans who knew the stories so he was custodian of the Banumbirr pole. He taught me that Banumbirr was the brightest star in the sky. It rose in the east, crossed each clan's country and set in the west, just before the dawn. He taught me that it symbolised the cycle of life and the metamorphosis that occurs within it." - Malu Gurruwiwi

Constellations Across Cultures: How Our Visual Systems Pick Out Patterns in the Night Sky
(Association for Psychological Science, Observer > 2022 > May/June)

There are hundreds of billions of stars in our galaxy, though only about 5,000 are visible to the naked eye. Under ideal conditions and far from city lights, you can see about half of them on any given night. Since humans are pattern-seeking animals, peoples across many cultures and eras have imagined that certain stars formed discrete shapes and patterns that held special meaning within their cultural traditions. Modern astronomy revealed that some of these patterns are actual star clusters—sibling stars born in the same stellar nurseries. Others are merely apparent groupings of stars that happen to cluster together along our line of sight. Today, we officially recognize 88 constellations, as determined by the International Astronomical Union. These formalized groupings—whose names were drawn from mostly Middle Eastern, Greek, and Roman cultures—help scientists and amateur astronomers carve up the celestial sphere into recognizable chunks to better locate relatively nearby and deep-space objects.

Perceptual grouping explains similarities in constellations across cultures

Charles Kemp, Duane W. Hamacher, Daniel R. Little and Simon J. Cropper, Psychological Science 2022, Vol. 33(3) 354–363 Link

ABSTRACT

Cultures around the world organize stars into constellations, or asterisms, and these groupings are often considered to be arbitrary and culture specific. Yet there are striking similarities in asterisms across cultures, and groupings such as Orion, the Big Dipper, the Pleiades, and the Southern Cross are widely recognized across many different cultures. Psychologists have informally suggested that these shared patterns are explained by Gestalt laws of grouping, but there have been no systematic attempts to catalogue asterisms that recur across cultures or to explain the perceptual basis of these groupings. Here, we compiled data from 27 cultures around the world and found that a simple computational model of perceptual grouping accounts for many of the recurring cross-cultural asterisms. Our results suggest that basic perceptual principles account for more of the structure of asterisms across cultures than previously acknowledged and highlight ways in which specific cultures depart from this shared baseline.

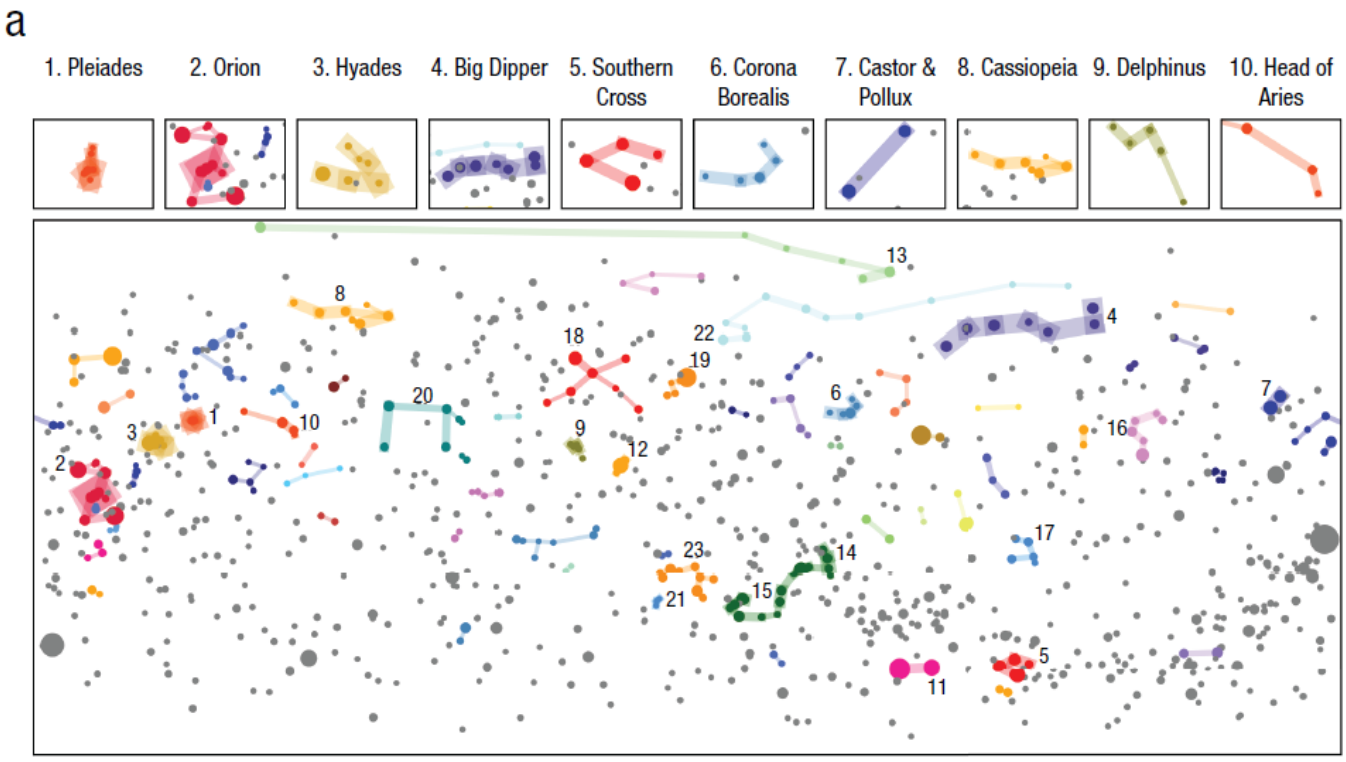
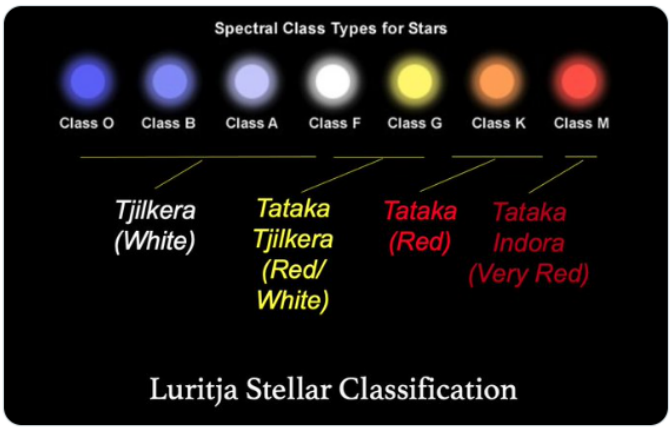


Fig. 1. Common asterisms across cultures (a) compared with model asterisms (b). The consensus system in (a) was created by overlaying minimum spanning trees for all asterisms in our data set of 27 cultures. The width of the line (edge) connecting two stars indicates the number of times that edge appears across the entire data set. Thick edges indicate stars that are grouped by many cultures, and edges that appear three or fewer times are not shown. Node sizes indicate apparent star magnitudes, and only stars with magnitudes brighter than 4.5 have been included. Insets show 10 of the most common asterisms across cultures, and numbers greater than 10 identify additional asterisms mentioned in the text or Table 1: Southern Pointers (11), shaft of Aquila (12), Little Dipper (13), head of Scorpius (14), stinger of Scorpius (15), sickle in Leo (16), Corvus (17), Northern Cross (18), Lyra (19), square of Pegasus (20), Corona Australis (21), head of Draco (22), and teapot in Sagittarius (23). Asterisms according to the graph clustering model (n = 320) are shown in (b). The model assigns a strength to each edge in a graph defined over the stars; here, the strongest 320 edges are shown. Edge widths are proportional to the strengths assigned by the model.

Indigenous Astronomy
@AboriginalAstro

Star colours are an extremely important aspect of #Indigenous #Astronomy. Luritja #Aboriginal people of Central #Australia developed a stellar classification system based on #star colour, primarily focusing on red and white stars.

#thefirstastronomers #astrophysics #science



Astronomy Magazine and 8 others

12:19 PM · Mar 21, 2022 · Twitter Web App

31 Retweets 1 Quote Tweet 74 Likes

Indigenous Astronomy
@AboriginalAstro

A majority of stars you see in the sky appear white (F/A class, such as #Sirius & #Canopus).

Some appear blue (O/B-class, such as #Rigel), orange (K-class, such as #Arcturus), red (M-class, such as #Betelgeuse).

Red stars have special importance due to their relative rarity

You and 4 others

12:19 PM · Mar 21, 2022 · Twitter Web App

Indigenous Astronomy
@AboriginalAstro

Red stars often reflect the colour of their terrestrial counterpart in Indigenous Knowledge Systems as a memory marker.

One example is the red-tailed black #cockatoo, which is linked to the star #Antares and planet #Mars in Aboriginal traditions across the Great Victoria Desert.

12:19 PM · Mar 21, 2022 · Twitter Web App

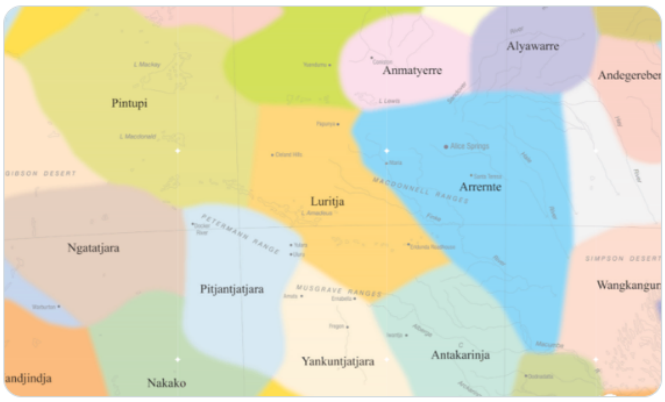
3 Retweets 12 Likes

Indigenous Astronomy
@AboriginalAstro

Sources

Maegraith, B.G. (1932) The astronomy of the Aranda and Luritja Tribes. Transactions and Proceedings of the Royal Society of South Australia, Vol. 56, pp. 19-26.

Images: Bob McPherson (cockatoo), AIATSIS (map), Tragoolchitr Jittasaiyapan/NASA (stars), D.Hamacher (figure)



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First Knowledges – Sky Country

(Karlie Noon & Krystal de Napoli, Thames & Hudson Australia Pty Ltd: 26 April 2022) [Link]

Aboriginal and Torres Strait Islander people are the oldest scientists in human history. Many First Peoples regard the land as a reflection of the sky and the sky a reflection of the land. Sophisticated astronomical expertise embedded within the Dreamtime and Songlines is interwoven into a deep understanding of changes on the land, such as weather patterns and seasonal shifts, that are integral to knowledges of time, food availability, and ceremony. In *Astronomy: Sky Country*, Karlie Noon and Krystal De Napoli explore the connections between Aboriginal environmental and cultural practices and the behaviour of the stars, and consider what must be done to sustain our dark skies, and the information they hold, into the future.

You Retweeted

Krystal De Napoli
@KrystalDeNapoli

I chose to dedicate the book to my 6 wonderful siblings over a year ago, but wanted to inform them by gifting them a copy each.

This past weekend I drove 700 km to see all of my siblings, and share the news, and it was so good for the soul ❤️ I've missed them terribly

9:02 PM · Apr 26, 2022 · Twitter for iPhone

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You Retweeted

Australian Indigenous Psychologists Ass... @Indigeno... · Mar 18

Yaama ngingda gaba you lovely bunch 🌞
My name is Karlie Alinta Noon, I am a Gamilaroi yinarr from Tamworth. My fam are the Smith's & Stanley's from Moree & Wellington ways.
Here's me smiling big on Ngambri & Ngunnawal lands where I'm attempting to do a PhD in radio astronomy.

33 94 1,360

Thousands of satellites are polluting Australian skies, and threatening ancient Indigenous astronomy practices ***(Karlie Noon, Astronomer, Australian National University, The Conversation: 22 April 2022)***

NGC 3372 - Close-up
Photo by E. F. Bueno on flickr

Since time immemorial, Indigenous peoples worldwide have observed, tracked and memorised all the visible objects in the night sky. This ancient star knowledge was meticulously ingrained with practical knowledge of the land, sky, waters, community and the Dreaming — and passed down through generations. One of the most well-known and celebrated Aboriginal constellations is the Emu in the Sky, which appears in the southern sky early in the year. It is an example of a dark constellation, which means it's characterised by particularly dark patches in the sky, rather than stars. Conversely, space technology companies such as Starlink are increasingly competing to dominate the skies, and potentially change them forever.

Indigenous knowledge systems and oral traditions teach us about the intricate and complex relationships Indigenous peoples have with the environment, including the sky. For example, many Aboriginal and Torres Strait Islander cultures have no concept of "outer space". They only have a continuous and connected reality where coexistence with all things is paramount. As captured by the Bawaka Country group, based in northeast Arnhem Land: …to hurt Sky Country, to try and possess it, is an ongoing colonisation of the plural lifeworlds of all those who have ongoing connections with and beyond the sky. Desecrating the sky impacts Indigenous sovereignty as it limits access to their knowledge system, in the same ways desecrating the land has removed First Peoples from their countries, cultures and ways of life. For example, the Gamilaraay and Wiradjuri peoples of New South Wales observe the Emu in the Sky to gauge when it is time to hunt for emu eggs — and most importantly, when it is time to stop. How would the Gamilaraay know when to stop collecting eggs, or when to conduct annual ceremonies signalled by the Celestial Emu, if it was no longer visible?

The Bulletin of the Indigenous Science Network is distributed four times a year via email directly to members. Membership is open to all. If interested in being a part of the Network, please contact the Coordinator via email at IndigenousSciNet@yahoo.com. Issues distributed in February, May, August and November each year.

The Collation, Preservation and Revitalisation of Maori Astronomy

(Dr Pauline Harris, Wellington University: Jan 2015)

Dr Pauline Harris is a Rongomaiwahine, Ngāti Rakaipaka and Ngāti Kahungunu Māori woman and #astrophysicist. She's a Senior Lecturer in the Centre for Science in Society @WellingtonUni and Chair of the Society for Maori Astronomy Research & Traditions. She gave a Lecture on Maori Astronomy recorded at the Linux.conf.au 2015 -- Auckland, New Zealand. Although 7 years ago, the lecture contains much of value and is a nice counterpoint to all the Australian material we offer each bulletin (note the previous 17 items in this section – Aussie[3] Oi[3]).

Māori Astronomy Tātai Arorangi

- Infused throughout many aspects of traditional life and belief.
- Cosmology and Creation.
- Agriculture (planting).
- Fishing.
- Calendrical Systems.
- Prophetic, fortelling of future events.
- Linguistic record, whakatauki, moteatea, waiata, karakia.

Indigenous Astronomy
@AboriginalAstro

#Ancient and #Indigenous cultures of the world developed knowledge systems long ago and constructed #monuments that reflect detailed knowledge of the #Sun, #Moon & #stars. The sky played an important role in ceremony, #political structures, #architecture, and social development.

3:58 PM · Apr 1, 2022 · Twitter Web App

1 Retweet **6** Likes

The Temple of Kukulcan features in our ISN Facebook and Twitter homepage headers, along with the cover on these bulletins.

El Castillo

La Pirámide, known as the Temple of Kukulcán, is a Mesoamerican step-pyramid that dominates the center of the Chichen Itza archaeological site in the Mexican state of Yucatán. The pyramid building is more formally designated by archaeologists as Chichen Itza Structure 5B18. Wikipedia

Height: 30 m

Material: Limestone

Architectural style: Maya architecture

Owner: Instituto Nacional de Antropología e Historia

Base: 55.3 m (181 ft)

Slope: 37°29'44" (edges); 47°19'50" (sides)

Indigenous Astronomy @AboriginalAstro · Apr 1

Replying to @AboriginalAstro

Today, much of this knowledge is restricted to the material record, such as temples, rock art, stone arrangements, and monuments - paying particular reference to the local #landscape and #skyscape. This subject will introduce students to the discipline of #archaeoastronomy

Atchakosuk: Ininewuk Stories of the Stars
(Wilfred Buck, Manitoba First Nations Education Resource Centre, 2021)

You Retweeted

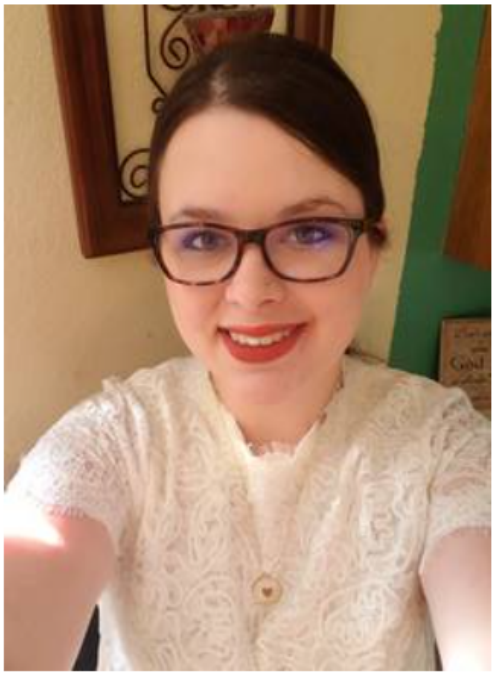
tsinclair76
@tsinclair76

@faisal_moola
Seven Thunderbirds representing seven stars of a constellation Anishnaabe people call Bagone Geezhik. The hole in the sky. The doorway to heaven Painted on @ROMtoronto as an act of reconciliation for the ancestors and their bundles that were taken from burial mounds

11:27 AM · Feb 23, 2022 · Twitter for iPhone

Elizabeth Apala: Astrophysicist and Advocate for Diversity, Equity, and Inclusion

Name: Elizabeth Apala
Title: Astrophysicist
Organization: Astrophysics Science Division, Science Directorate (Code 660)



Credits: courtesy Elizabeth Apala

What do you do and what is most interesting about your role here at Goddard? How do you help support Goddard's mission?

I started worked for Goddard in November 2020. I spend half of my time working on diversity, equity and inclusion to help increase minority representation within our division and others; and I spend the other half of my time working on outreach. Eventually, I will spend a quarter of my time on outreach and a quarter on research.

What is your favorite part about your job?

I love working with people with a spark in their eyes, getting them the resources that they need and helping them grow.

What makes your Native American heritage important to you?

I grew up in Oklahoma in Choctaw Nation. I am a member of the Choctaw Nation and the Chickasaw Nation. To be considered a Native American, you have to trace your genealogy to the original Native Americans as compiled in the Dawes Rolls. Many generations ago, my family got their Certificate of Indian Blood (CIB) which applies to me.

Before the English and Spaniards arrived to America, there were over 500 tribes throughout the United States. It is so strange to me that Native Americans are so highlighted and their history is so rich where I grew up, but when I went to the East Coast, it seemed no one knew much about Native Americans. It was a culture shock.

Our history is horribly sad. We were subject to the largest genocides in history. Native Americans were forcibly removed, killed off and enslaved. We did not continue to be enslaved because we died off too easily due to contact with European diseases so we were not profitable as slaves.

If you do not know about Native Americans, do not be afraid to ask us questions. We are storytellers by blood. We pass down our traditions through stories, sometimes in our own languages, even though many of our languages are now dying.

What do you see as the tie between Native Americans and astrophysics?

We have always studied the stars. We have our own astronomy studies and Natives used the stars to navigate. Native Americans in general have our own stories to tell about the stars, our own mythology. We have fables about constellations that we tell our children. So it was natural for me to go into astrophysics.

WEBSITES

To learn more and attend upcoming events, please follow us on social media and visit our website

- www.aboriginalastronomy.com.au
- www.facebook.com/AboriginalAstronomy
- twitter.com/aboriginalastro

CONFERENCES / SEMINARS / WEBINARS - AUSTRALIA

ASERA 53 - Curtin University, Perth WA

28th June - 1st July 2022

The Australasian Science Education Research Association annual conference. Drawing together science education researchers from Australia, New Zealand, the region and the world. Sharing cutting-edge research methods and findings in science education from pre-school, school, university, technical and informal settings to inform practice.

Call for abstracts - November 2021
Abstract deadline - February 2022
Registrations open - March 2022

WORLD INDIGENOUS PEOPLES' CONFERENCE ON EDUCATION ADELAIDE, SOUTH AUSTRALIA, 26 – 30 SEPT 2022 (POSTPONED AGAIN DUE TO COVID)

WIPCE 2021
Panpapanpalya
Indigenous Education Sovereignty: Our Voices … Our Futures

Postponed from 2020 and 2021, WIPCE 2022 will feature an exciting Indigenous education program of keynote presentations, networking, interactive workshops and discussion forums with an associated rich and diverse cultural program. An estimated 370 million Indigenous peoples live in all continents of the earth and represent a significant part of the world's vast cultural and linguistic diversity and heritage.

Indigenous peoples possess unique knowledge systems, which are recognised as crucial for sustainable development. At the same time, social, economic and political marginalisation of Indigenous peoples is pervasive in all the regions across the world.

Indigenous peoples face fundamental challenges when attempting to reconcile their own forms of culturally transmitted learning with systems of formal education. Over the past 30 years, WIPCE has endeavoured to address this issue and has grown to become a major international event in the Indigenous education movement. The WIPCE conference draws Indigenous representatives from across the globe to share successes and strategies for culturally grounded education. The needs of young Indigenous educators and leaders will be a key feature of WIPCE 2021 youth forums. WIPCE attracts Indigenous education experts, practitioners, scholars, students and communities, with up to 5,000 delegates expected in 2021 – the largest and most diverse Indigenous education forum on earth.

International Science and Eco Festival, Cairns QLD Australia

18 – 20 Aug 2022, Cairns Pier

Illuminate FNQ is a not-for-profit NGO aiming to increase Aboriginal and Torres Strait Islander community participation and success in STEM. Among a number of projects they are currently working on, there will be a three day event in Cairns which will increase public understanding and appreciation of the Great Barrier Reef, the rainforest, and other FNQ environmental features including the challenges facing them from global warming. For more information and to register your interest, please go to:

https://www.illuminatefnq.com.au/international-science-eco-festival

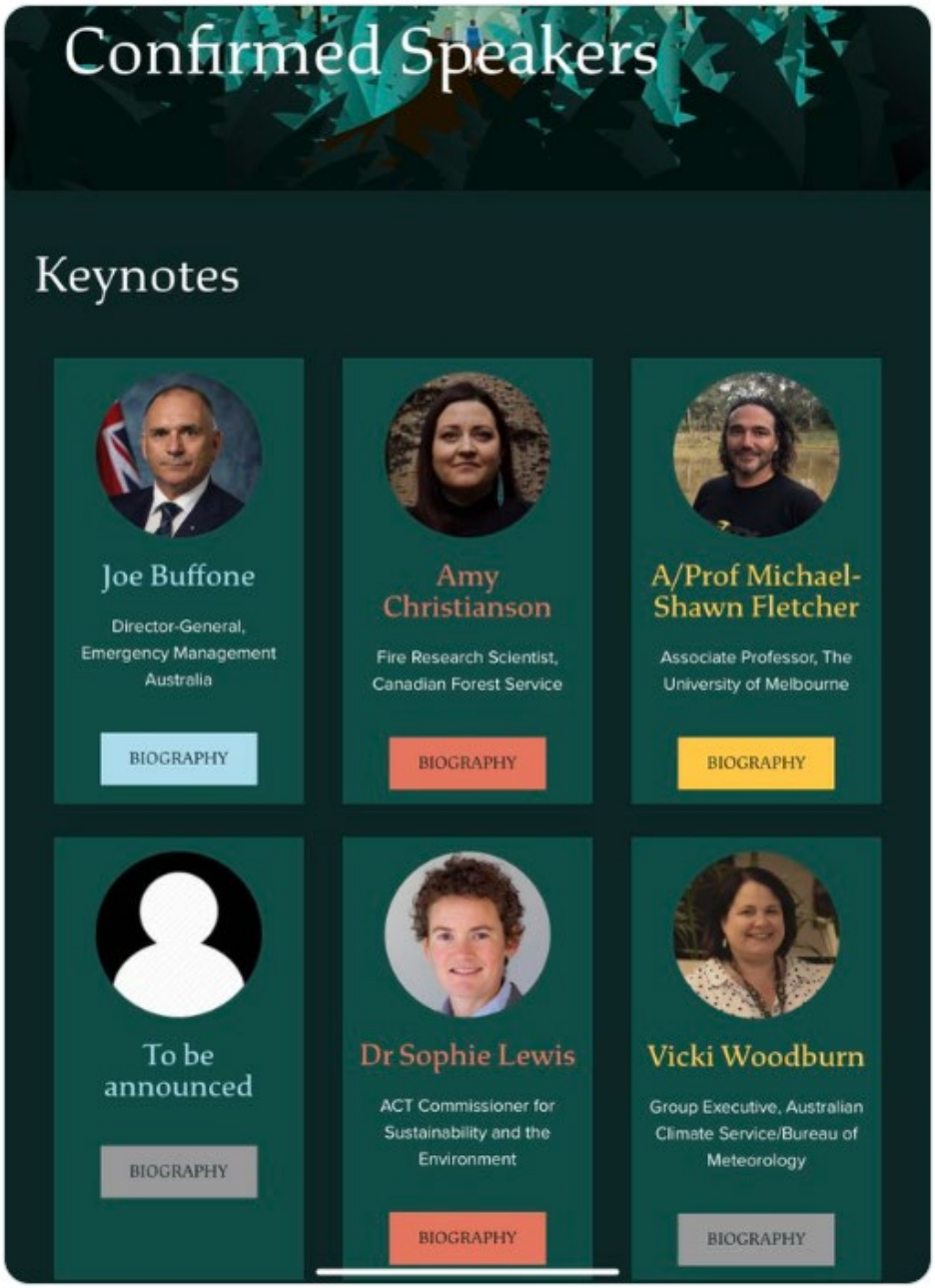
You Retweeted

Michael Fletcher
@theotheroad

Excited for my keynote and Q&A at the @IAWF conference in Melbourne this June. I am stoked to be bringing an Indigenous perspective to the scientific and cultural dimensions of fire with @ChristiansonAmy

“Fire and Climate: impacts, issues and futures”

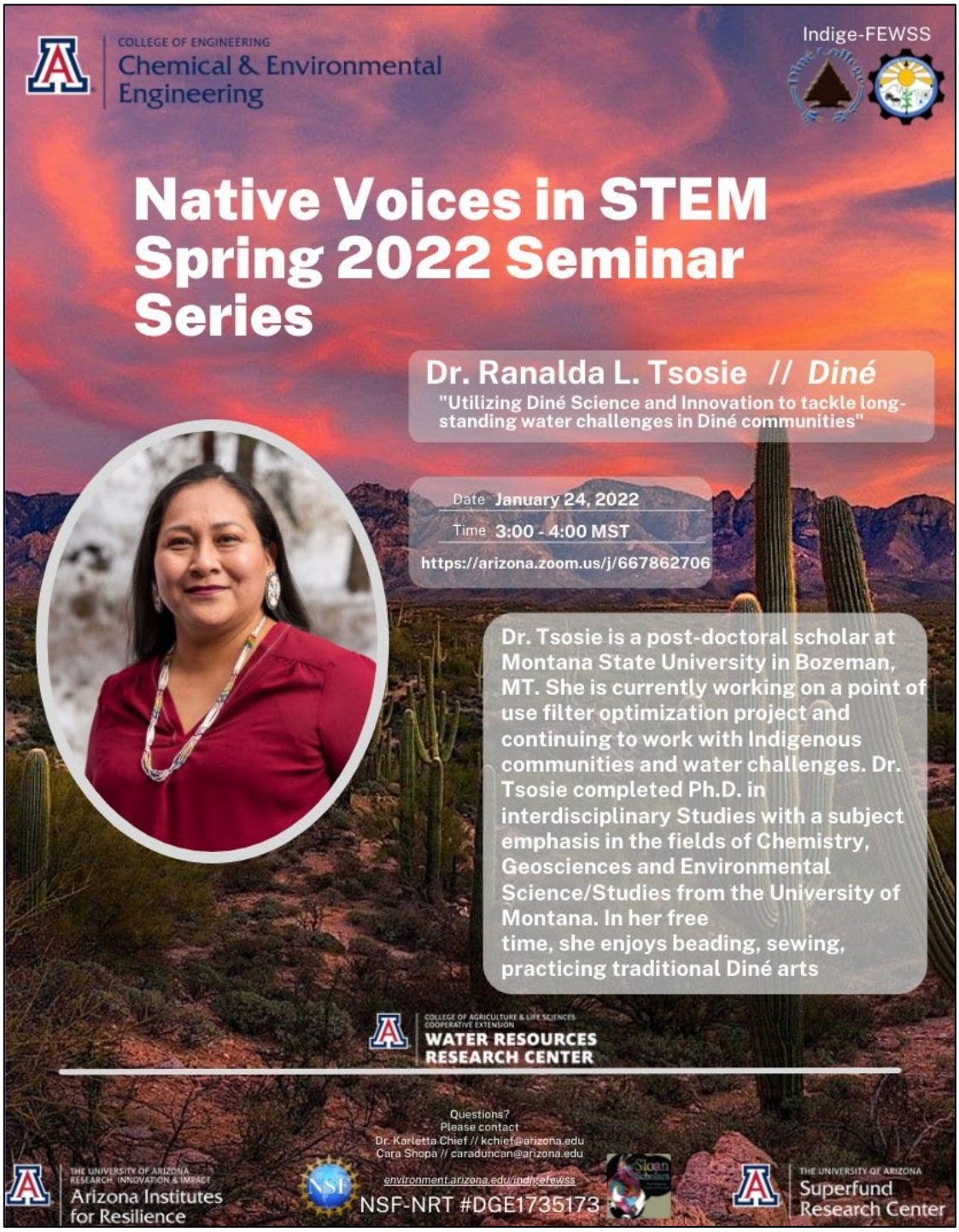
fireandclimateconference.com/melbourne/melb...



12:38 PM · Feb 12, 2022 · Twitter for iPad

Indige-FEWSS Native Voices in STEM

The Spring 2022 seminars are co-sponsored by the UArizona-Sloan Indigenous Graduate Partnership, the Department of Chemical & Environmental Engineering, and Indigenous Food, Energy, and Water Security and Sovereignty. This professional seminar series invites Native scientists, engineers, activists, community members and leaders to share their personal and professional journeys, providing inspiration to the next generation of change makers. The first seminar kicks off on 24 Jan 2022, with seminars following over the next three months. Link



2022 TURTLE ISLAND INDIGENOUS SCIENCE CONFERENCE

University of Manitoba, Fort Garry Campus, Winnipeg, MB CANADA: June 14 – 16, 2022

Join us as we explore the Indigenous scientific legacy and the value of the application of two-eyed seeing to modern science today. The "Indigenous Way of Knowing" is the Indigenous approach to understanding the five elements of the world: fire, water, earth, air, and spirit. Many North Americans, including Indigenous peoples, aren't aware of the rich Indigenous scientific legacy and the value of the application of two-eyed seeing to modern science today. Through interactive sessions with world-renowned speakers, cross-pollination of ideas, approaches and goals to raise the profile of Indigenous STEM science will be realized. Indigenous scientific accomplishments that rivalled those of the rest of the world will be explored among other topics. Registration opens January 1, 2022!

University of Manitoba Hosts Turtle Island Indigenous Science Conference

(Emma Rempel, The Manitoban: 5 April 2022) Link

Cultural traditions and language shape the ways people learn and view the world. For too long, Indigenous perspectives and traditional knowledge have been excluded from scientific discussions. Professors at the University of Manitoba have organized the upcoming Turtle Island Indigenous Science Conference to explore the legacy of Indigenous contributions to science. Two-eyed seeing, or *Etuaptmumk*, encourages scientists, teachers and students to consider questions from two viewpoints: the traditional scientific view and the Indigenous way of knowing. A principle of cross-cultural understanding, *Etuaptmumk* was developed and popularized by Mi'kmaw Elder Albert Marshall. The word *Etuaptmumk* comes from the Mi'kmaw language and translates to "the gift of multiple perspectives."

“Two-eyed seeing is very important, because it enables people to see from both the Indigenous lens and the western lens,” said Myrle Ballard, an assistant professor in the department of chemistry and an Indigenous scholar. She spoke to the Manitoban about what participants can expect. “This will be a great conference and is the first of its type at the University of Manitoba,” said Ballard. Named after a creation story shared among many Indigenous peoples, the conference will host interactive workshops and sessions to explore science through an Indigenous perspective. Among the topics for discussion are the value of applying the principle of two-eyed seeing in modern scientific research.

ICIES 2022: 16. International Conference on Indigenous Education Studies

December 01-02, 2022 in Auckland, New Zealand

International Conference on Indigenous Education Studies aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results on all aspects of Indigenous Education Studies. It also provides a premier interdisciplinary platform for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the fields of Indigenous Education Studies.

2022 International Conference on Technologies in STEM 'LIVE'

13 & 14 Dec 2022, Singapore

We're pleased to announce that the 2022 International Conference on Technologies in STEM (ICTSTEM 2022), organized by East Asia Research and supported by Australia's Curtin University, will be a hybrid conference happening in Singapore from December 13-14, 2022! Learn from the masters of STEM education at the premier conference for the global Educator community. The conference aims to further the application of technology education within STEM and specific learning areas. Within Technology education, students use design and/or computational thinking and technologies to generate and produce designed solutions both digital and physical for authentic problems. As such it applies to many areas of STEM. We invite practitioners and researchers to network and share their experiences. Teachers, heads of learning areas, and teacher educators, researchers, and HDR researchers from K to higher education are all encouraged to attend. A broad range of technology education topics, including significant developments as well as innovative uses of technology that promote learning, performance, and instruction, will be presented at ICTSTEM 2022. *Due to the persistence of COVID-19, the conference will be conducted in a 'Hybrid Format'. Participants can make oral/poster presentations onsite or send us pre-recorded video presentations and register as a 'Virtual Presenter'. They will indicate their preferred presentation medium when they register. The 'Early Bird Registration Deadline' is on July 14th, 2022.*