NEWS and VIEWS

Finding meteorite impacts in Aboriginal oral tradition
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Figure 1: Aboriginal stories dating back many thousands of years talk of a fire from the sky in an area now home to the Henbury meteorite craters, in the Northern Territory. Image: Flickr/Boobook, CC BYNC-SA

Imagine going about your normal day when a brilliant light races across the sky. It explodes, showering the ground with small stones and sending a shock wave across the land. The accompanying boom is deafening and leaves people running and screaming.

This was the description of an incident that occurred over the skies of Chelyabinsk, Russia on February 15, 2013, one of the best recorded meteoritic events in history. This airburst was photographed and videoed by many people so we have a good record of what occurred, which helped explain the nature of the event.

But how do we find out about much older events when modern recordings were not available?

A century before Chelyabinsk, a similar event occurred on July 30, 1908, over the remote Siberian forest near Tunguska.
That explosion was even more powerful, flattening 80 million trees over an area of 2,000 square kilometres and sending a shock wave around the Earth – twice. It was 19 years before scientists reached the Tunguska site to study the effects of the blast.

![Effects of the Tunguska blast 19 years after the event. Some of the trees flattened by the airburst can still be seen to this day. Image: Leonid Kulik](image)

The apparent lack of a meteorite fuelled speculation about how it formed, from sober suggestions of an exploding comet to more outlandish claims of mini-black holes and crashed alien spacecraft (research confirms it was an exploding meteorite).

**Meteoric events in Indigenous oral tradition**

In 1926, the ethnographer Innokenty Suslov interviewed the local Indigenous Evenk people, who still vividly remembered the Tunguska airburst.

At the time, a great feud persisted among Evenki clans. One clan called upon a shaman named Magankan to destroy their enemy. On the morning of July 30th, 1908, Magankan sent Agdy, the god of thunder, to demonstrate his power.

![A carving of the thunder god Agdy at Tunguska. Image: University of Bologna, Department of Physics.](image)
Many Indigenous cultures attribute meteoritic events to the power of sky beings. The Wardaman people of northern Australia tell of Utdjungon, a being who lives in the Coalsack nebula by the Southern Cross. He will cast a fiery star to the Earth if laws and traditions are not followed. The falling star will cause the earth to shake and the trees to topple. Like the Evenki, it seems the Wardaman have faced Utdjungon’s wrath before.

The Luritja people of Central Australia also tell of an object that fell to Earth as punishment for breaking sacred law. And we can still see the scars of this event today.

**A surviving meteorite impact legend**

Around 4,700 years ago, a large nickel-iron meteoroid came blazing across the Central Australian sky. It broke apart before striking the ground 145km south of what is now Alice Springs. The fragments carved out more than a dozen craters up to 180 meters across with the energy of a small nuclear explosion.

Today, we call this place the **Henbury Meteorites Conservation Reserve**.

![Figure 4: A cluster of the largest craters at Henbury, as seen from the nearby Bacon Range. Image: Duane Hamacher](image)

Aboriginal people have inhabited the region for tens-of-thousands of years, and it’s almost certain they witnessed this dramatic event. But did an oral record of this event survive to modern times?

When scientists first visited Henbury in 1931, they brought with them an Aboriginal guide. When they ventured near the site, the guide would go no further. He said his people were forbidden from going near the craters, as that was where the fire-devil ran down from the sun and set the land ablaze, killing people and forming the giant holes.

They were also forbidden from collecting water that pooled in the craters, as they feared the fire-devil would fill them with a piece of iron.

The following year, a local resident asked Luritja elders about the craters. The elders provided the same answer and said the fire-devil “will burn and eat” anyone who breaks sacred law, as he had done long ago.
The longevity and benefits of oral tradition
The story of Henbury indicates a living memory of an event that occurred a few thousands of years ago. Might then we find accounts of events from tens of thousands of years ago?

Yes, it seems so.

Recent studies show that Aboriginal traditions accurately record **sea level changes** over the past 10,000 years.

**Other studies** suggest the volcanic eruptions that formed the Eacham, Euramo and Barrine crater lakes in northern Queensland more than 10,000 years ago are recorded in oral tradition.

In addition to demonstrating the longevity of Indigenous oral traditions, emerging research shows that these stories can lead to new scientific discoveries. **Aboriginal stories** about objects falling from the sky have led scientists to meteorite finds they would not have known about otherwise.

In New Zealand, **geologists** are also using Maori oral traditions to study earthquakes and tsunamis. New Zealand has a much more recent human history – compared to Australia – with the first Maori ancestors **thought to have arrived** around the 13th Century.

The arrival of the first Australians goes back **at least 50,000 years**. There is still much to learn, as Australia’s ancient landscape has been exposed to meteorite strikes that we don’t know about, some of which have probably occurred since humans arrived.

But given that Australia is home to the oldest continuing cultures on Earth, we are only just scratching the surface of the vast **scientific knowledge** contained in Indigenous oral traditions.

We anticipate that our work with Aboriginal elders to learn about **Indigenous astronomy** will lead to new knowledge and **cultural insights** about natural events and meteorite impacts in Australia.

**References and Further Reading**

This article was originally published in The Conversation on 4 March 2015 and is reprinted here with the permission of the author. Dr Duane W. Hamacher is a Lecturer and ARC Discovery Early Career Research Fellow in the Nura Gili Indigenous Programs Unit at the University of New South Wales, in Sydney, Australia. His teaching and research focus on cultural astronomy and Indigenous Knowledge systems. He receives funding from the Australian Research Council.
World's largest asteroid impact zone believed uncovered by ANU researchers in central Australia

Technology gives new life to Aboriginal storytelling
http://www.abc.net.au/am/content/2015/s4206570.htm

British museums to return 'long lost' Aboriginal art

Endangered Indigenous songlines preserved with digital storytelling tools

RESOURCES

International Journal of Multicultural Education
Please visit the website of International Journal of Multicultural Education at http://ijme-journal.org/index.php/ijme. You can access both new issue from the "Current" link and back issues from the "Archives" link. With the "open-access" mission of the journal, we open the journal content to the world free of charge. We invite you to review the Table of Contents here and then visit our web site to review articles and items of interest.

http://ijme-journal.org/index.php/ijme/issue/view/33

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Reconciling Leadership Paradigms: Authenticity as Practiced by American Indian School Leaders (pp. 211-231)
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History, Power, Text: Cultural Studies and Indigenous Studies.

History, Power, Text: Cultural Studies and Indigenous Studies is a collection of essays on Indigenous themes published between 1996 and 2013 in the journal known first as UTS Review and now as Cultural Studies Review. This journal opened up a space for new kinds of politics, new styles of writing and new modes of interdisciplinary engagement. History, Power, Text highlights the significance of just one of the exciting interdisciplinary spaces, or meeting points, the journal enabled. ‘Indigenous cultural studies’ is our name for the intersection of cultural studies and Indigenous studies showcased here.

This volume republishes key works by academics and writers Katelyn Barney, Jennifer Biddle, Tony Birch, Wendy Brady, Gillian Cowlishaw, Robyn Ferrell, Bronwyn Fredericks, Heather Goodall, Tess Lea, Erin Manning, Richard Martin, Aileen Moreton-Robinson, Stephen Muecke, Alison Ravenscroft, Deborah Bird Rose, Lisa Slater, Sonia Smallacombe, Rebe Taylor, Penny van Toorn, Eve Vincent, Irene Watson and Virginia Watson—many of whom have taken this opportunity to write reflections on their work—as well as interviews between Christine Nicholls and painter Kathleen Petyarre, and Anne Brewster and author Kim Scott. The book also features new essays by Birch, Moreton-Robinson and Crystal McKinnon, and a roundtable discussion with former and current journal editors Chris Healy, Stephen Muecke and Katrina Schlunke.

See more at: http://epress.lib.uts.edu.au/books/history-power-text#sthash.7v1pRLJJ.dpuf
Recent paper

Abstract There is no consensus in the science education research community on the meanings and representations of western science and indigenous knowledge or the relationships between them. How students interpret these relationships and their perceptions of any connections has rarely been studied. This study reports student perceptions of the meaning and relationship between scientific and cultural knowledge. Personal meaning maps adapted for small groups were conducted in seven culturally diverse schools, school years 7–9 (with students aged 12–15 years) (n = 190), with six schools in Western Australia and one school in Malawi, Africa. Of the six Australian school groups, two comprised Australian Aboriginal students in an after-school homework programme and the other four schools had a multicultural mix of students. Students in this study identified connections between scientific and cultural knowledge and constructed connections from particular thematic areas—mainly factual content knowledge as opposed to ideas related to values, attitudes, beliefs and identity. Australian Aboriginal students made fewer connections between the two knowledge domains than Malawian students whose previous science teacher had made explicit connections in her science class. Examples from Aboriginal culture were the most dominant illustrations of cultural knowledge in Australian schools, even in school groups with students from other cultures. In light of our findings, we discuss the construction of common ground between scientific knowledge and cultural knowledge and the role of teachers as cultural brokers and travel agents. We conclude with recommendations on creating learning environments that embrace different cultural knowledges and that promote explicit and enquiring discussions of values, attitudes, beliefs and identity associated with both knowledge domains.


Abstract: Popular, independent, and social media across Canada are currently filled with stories of conflict related to natural resource development and exploitation in Indigenous territories. Protest and advocacy in response to these developments and social movements such as Idle No More are often motivated by a lack of recognition by government, industry, and much of Canadian society of Indigenous treaty and Aboriginal rights. In this article, Gregory Lowan-Trudeau shares insights from his recent experiences teaching and studying the tensions inherent in contemporary socio-ecological issues. He also introduces and discusses the duty to consult as an example of a commonly misunderstood area of Indigenous land and ecological rights. Finally, the article provides suggestions based on the author’s recent research for educators interested in exploring Indigenous land and ecological topics. Link: [http://www.cea-ace.ca/education-canada/article/teaching-tension](http://www.cea-ace.ca/education-canada/article/teaching-tension)


Abstract Aboriginal children experience social and educational disadvantage and many are not engaged with schooling or learning, which results in significantly lower levels of educational attainment. The Aboriginal Education Program delivered by Scitech to remote Western Australian schools has been shown to significantly increase student ratings of their enjoyment of science, curiosity about science phenomena and their rating of science as a favourite subject. Teachers reported that student focus and engagement was very high during the Scitech activities and that student attendance and behaviour was better than usual (Hackling, Byrne, Gower, & Anderson, 2012). This study investigated the practices used by the Scitech presenters that generated high levels of student engagement. Analysis of classroom observations and transcripts of classroom dialogue from lessons that generated high levels of engagement showed that a set of 11 pedagogies underpinned this engaging practice. The pedagogical practices addressed: relationship-building, facilitation of effective hands-on activity work, participation in classroom discourse and connecting the science activities to the student's experiences and local context. The findings of this study elaborate the Primary Connections Indigenous perspectives framework (Australian Academy of Science, 2008), and provide a model to underpin approaches to teaching Aboriginal children, and possibly other children, who are not engaged with learning science.
CONFERENCES

17th Annual International Conference on Education,
Athens, Greece
18-21 May 2015

The Athens Institute for Education and Research (ATINER), a world association of academics and researchers, organizes its 17th Annual International Conference on Education, 18-21 May 2015, Athens, Greece. Please submit a 300-word abstract before 6 April 2015, by email (atiner@atiner.com), addressed to Dr. Alexander Makedon, Head, Education Research Unit, ATINER & Professor of Philosophy of Education, Arellano University, Philippines.

Please include with this order: Title of Paper, First Name, Family name of all co-authors, Current Position of all co-authors, Institutional Affiliation (University/Organization) of all co-authors, Country of all co-authors, an email address of all co-authors and at least 3 keywords that best describe the subject of your submission. Decisions will be reached within four weeks of your submission.

Should you wish to participate in the Conference as a chair of a session, evaluate papers which are to be included in the conference proceedings or books, contribute to the editing of a book, or any other contribution, please send an email to Dr. Gregory T. Papanikos, President, ATINER & Honorary Professor, University of Stirling, UK (gregory.papanikos@stir.ac.uk).

Traditional Knowledges Conference
Brisbane Convention Centre
25 & 26 June 2015

This conference will create a culturally safe space for discourse on First Nations Australians Ways of Knowing and Ways of Doing. It will include dialogue pertaining to the implementation of Traditional Knowledge through Research, Education, Cultural & Traditional Practices. It will also explore the multifaceted social, emotional, spiritual, environmental and political issues impacting on the lives of First Nations Australians in today’s evolving society.

Hotel de Albuquerque - Albuquerque, New Mexico
3-5 September 2015

The conference is funded by the Advancing Informal STEM Learning (AISL) Division of the National Science Foundation and is co-sponsored by the University of Hawai‘i at Hilo.

The three-day event will convene principal investigators, educators, scientists, policymakers, learning researchers, and youth to advance research aimed at the convergent margin of Native and Western science in the field of informal STEM learning. The goals of the conference are to:

- Integrate and synthesize approaches, methods, and findings to date;
- Formulate a research agenda in this area;
- Provide participants with the opportunity to experience living examples of the confluence of
  - Native and Western science within the unique setting of Albuquerque, NM
  - The conference will be preceded by a six-week online discussion of issues that will be addressed in the conference. Discussions will focus on the importance of taking into account Indigenous world-views to enhance public science literacy and improve STEM education,
career opportunities, and lifelong learning for Native youth. The results of the conference and following discussions will be synthesized and are expected to contribute towards advancing the informal science education field.

Dates of Optional Excursions: September 2 (Acoma Pueblo Feast Day) and September 6 (Chaco Canyon)
Ka‘iu Kimura, Executive Director, ‘Imiloa Astronomy Center of Hawai‘i
Nancy C. Maryboy, PhD. President, Indigenous Education Institute
For more information please contact Minoaka Macanas: Email: iwise@imiloahawaii.org
Phone: 808-969-9708

Indigenous Content in Education Symposium 2015
University of South Australia, Adelaide
21 September 2015

This symposium will examine approaches to engaging Indigenous knowledges, pedagogies and curriculum. It will provide an opportunity to build communities of best practice across a range of disciplines including: science, technology, engineering and mathematics (STEM); humanities; social sciences; education; health; business and Indigenous studies. The Symposium will bring together academics, teachers, community members and students.

The symposium will provide us with an opportunity to explore: Best practice when engaging Indigenous perspectives, knowledges and pedagogies Engaging Indigenous perspectives, knowledges and pedagogies in different disciplines, such as STEM, health, business and humanities How students learn best about culture and Indigenous Australians Creating spaces for Indigenous perspectives and voices in curriculum Creating institutional readiness.
For more information please visit:
https://docs.google.com/forms/d/1XLFfWSINISO71ez80LqxBYnaL2hIwGeGYPXECCh36g/viewform

NIRAKN & NATSIHEC International Indigenous Research Conference
Stamford Plaza Nth Terrace
Adelaide, South Australia
29-30 September 2015

The National Indigenous Research and Knowledges Network (NIRAKN) and the National Aboriginal and Torres Strait Islander Higher Education Consortium (NATSIHEC) are calling for scholars working on any aspect of Indigenous or Critical Indigenous Studies to submit papers for the inaugural NIRAKN/NATSIHEC International Indigenous Research Conference. Both NIRAKN and NATSIHEC have jointly convened the conference as a means of showcasing Indigenous research across Australia and beyond.

As well as seeking papers that illustrate the breadth of research undertaken by Indigenous researchers in such areas as health, education, science, history and sociology amongst others, we welcome papers that reflect upon the status of Indigenous research and its place within Indigenous studies as a discipline.

This conference also asks scholars to consider what we mean by ‘critical’ in Indigenous studies and whether this appellation convincingly marks a distinction between ways of framing Indigenous and non-Indigenous research problematics. In this context, we seek papers that engage with whether a properly ‘critical’ Indigenous research agenda can strategically operationalise Indigenous knowledges?
Disasters, Controversies and Public Engagement
Kaohsiung, Taiwan
1-4 October 2015

Asia-Pacific STS Network is pleased to announce the Call for Papers for the biennial conference, to be held in Kaohsiung, Taiwan, Oct 1st~4th, 2015.

Over the past several years, the Asia-Pacific has experienced disasters on various scales and severity, often compounded by technological system failures, such as the 311 earthquake and the Fukushima nuclear disaster in Japan, the Sowel ferry disaster in Korea, and the propene explosion in Kaohsiung, Taiwan. In addition, recent scandals regarding food safety in Taiwan and China have created a sense of urgency. These disasters and threats have brought major controversies over how to ensure a safe future in a risk society, and they have also drawn people from different sectors to participate in the discussion. Most importantly, the public has become even more critical in shaping the climate of civil and policy making opinions. Confronting these disasters, how do we mobilize and empower the public to engage in the improvement of a technological society in order to increase our resilience in the face of giant disasters?

Conference Website: http://apstn.tw-sts.org/

Six Nations Polytechnic and TAP Resources are pleased to announce their successful partnership bid to host the 2017 World Indigenous Peoples’ Conference on Education (WIPCE 2017) in Toronto (no dates yet).
http://www.wipce2017.com/

CALENDAR OF EVENTS

This is mostly a summary of upcoming conferences. More details may have been given in this or previous bulletins as shown. A web-based contact is usually included. Inclusion of conferences in this list should not to be read as an endorsement of the conference.

2015

April

23-26 April: International Conference on Education in Mathematics, Science and Technology (ICEMST), Antalya, Turkey (http://www.icemst.com) (Dec14)

24-26 April: IOSTE Eurasia Regional Symposium & Brokerage Event Horizon 2020-Science with and for Society, Istanbul, Turkey (http://www.ioste2015.org) (Dec14)

May
18-21 May: 17th Annual International Conference on Education, Athens, Greece (April15)

June
25-26 June: Traditional Knowledges Conference, Brisbane Convention Centre

**July**


**September**


**October**


**2016**

**April**

14-17 April: National Association for Research in Science Teaching (NARST) conference, Renaissance Baltimore Harborplace Hotel, Baltimore, MD, USA

**June-July**

Australasian Science Education Research Association (ASERA) conference, Canberra (host: University of Canberra)

**2017**