NEWS and VIEWS

Succession Planning – a Reminder

I would like to remind readers that plans are in train for the position of editor of the Indigenous Science Network Bulletin to pass to Dr Femi Otulaja at the beginning of 2018. Femi is based at the University of Witwatersrand in South Africa and he has been co-editing the bulletin during 2017.

We have now reached the second phase of the transition which affects you, the readers. You have probably received notices by email as each issue of the bulletin becomes available, and I have maintained the distribution list for the past 20 years. However this list needs to be updated and transferred to Femi. To do this you need to let us know that you wish to continue to receive the bulletin by sending Femi an email.

Please follow the instructions below:

1. Send an email to Femi Otulaja at this email address: fso2000@nyu.edu
2. List the subject as: Distribution list – Indigenous Science Network Bulletin
3. Please send the email from the address where you wish to receive the bulletin, and make sure it includes your full name.

The third phase of the transition is the archiving of the past bulletins. The archive will remain on my website for now, but I am making arrangements to have the archive established elsewhere. You will be notified where this is once negotiations have been concluded.

Michael Michie
Co-Editor

Stars that vary in brightness shine in the oral traditions of Aboriginal Australians

The Conversation, 9 November, 2017
Duane Hamacher

Aboriginal Australians have been observing the stars for more than 65,000 years, and many of their oral traditions have been recorded since colonisation. These traditions tell of all kinds of celestial events, such as...
the annual rising of stars, passing comets, eclipses of the Sun and Moon, auroral displays, and even meteorite impacts.

But new research, recently published in The Australian Journal of Anthropology, reveals that Aboriginal oral traditions describe the variable nature of three red-giant stars: Betelgeuse, Aldebaran and Antares. This challenges the history of astronomy and tells us that Aboriginal Australians were even more careful observers of the night sky than they have been given credit for.

Read more: Kindred skies: ancient Greeks and Aboriginal Australians saw constellations in common

What is a variable star?
The Greek philosopher Aristotle wrote in 350BCE that the stars are unchanging and invariable. This was the position held by Western science for nearly 2,000 years.

It wasn’t until 1596 that this was proved wrong, when German astronomer David Fabricius showed that the star Mira (Omicron Ceti), in the constellation of Cetus, changed in brightness over time.

In the 1830s, astronomer John Herschel observed the relative brightness of a handful of stars in the sky. Over the course of four years, he noticed that the star Betelgeuse, in Orion, was sometimes fainter and sometimes brighter than some of the other stars. His discovery paved the way for an entire field of astrophysics dedicated to studying the variable nature of stars.

But was Herschel the first to recognise this?

There is evidence that ancient Egyptians observed the variability of the star Algol (Omicron Persei). Algol consists of two stars that orbit each other. As one moves in front of the other, it blocks the other star’s light, causing it to dim slightly. This is called an eclipsing binary. It can be seen in the sky as the winking eye of Medusa’s head in the Western constellation Perseus.

Are there any clear records from oral or Indigenous cultures that demonstrate knowledge of variable stars? Emerging research reveals two Aboriginal traditions from South Australia that show the answer is a clear “yes”.

Nyeeruna and the protective Kambbugudha
A Kokatha oral tradition from the Great Victoria Desert tells of Nyeeruna, a vain hunter who comprises the same stars, in the same orientation, as the Greek Orion.

He is in love with the Yugarilya sisters of the Pleiades, but they are timid and shy away from his advances. Their eldest sister, Kambbugudha (the Hyades star cluster), protects her younger sisters.

Nyreuna creates fire-magic in his right hand (Betelgeuse) to overpower Kambbugudha, so he can reach the sisters. She counters this with her own fire magic in her left foot (Aldebaran), which she uses to kick dust into Nyreeuna’s face. This humiliates Nyreeuna and his fire-magic dissipates.

Nyreuna is persistent and replenishes his fire-magic again to get to the sisters. Kambbugudha cannot generate hers in time, so she calls on Babba (the father dingo) for help. Babba fights Nyreuna while Kambbugudha and the other stars laugh at him, then places a row of dingo pups between them. This causes Nyreuna much humiliation and his fire-magic dissipates again.

The story explains the variability of the stars Betelgeuse and Aldebaran. Trevor Leaman and I realised this in 2014, but we did not realise until now that the story also describes the relative periods of these changes.
Betelgeuse varies in brightness by one magnitude every 400 days, while Aldebaran varies by 0.2 magnitudes at irregular periods. The Aboriginal people recognised that Betelgeuse varies faster than Aldebaran, which is why they say that Kambugudha cannot generate her fire-magic in time to counter Nyreeuna.

**Waiyungari and breaking sacred law**

The second oral tradition comes from the Ngarrindjeri people, south of Adelaide. The story tells of Waiyungari, a young initiate who is covered in red ochre.

He is seen by two women, who find him very attractive. That night, they seduce him, which is strictly against the law for initiates. To escape punishment, they climb into the sky where Waiyungari becomes the star Antares and the women become the stars Tau and Sigma Scorpii, who flank him on either side.

The Ngarrindjeri people say Waiyungari signals the start of Spring (Riwi) and occasionally gets brighter and hotter, symbolising his passion for the women. It is during this time that initiates must refrain from contact with the opposite sex. Antares is a variable star, which changes brightness by 1.3 magnitudes every 4.5 years.

**What does this tell us?**

Ruddy celestial objects hold special significance in Aboriginal traditions - from red stars to lunar eclipses to meteors - which may be one of the reasons why these stars are so significant.

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Read more: *The Memory Code: how oral cultures memorise so much information*

Red objects are often related to fire, blood and passion. Psychological studies show that the colour red enhances sexual attraction between people, which may explain why both stories relate to sexual desire and taboos.

The Aboriginal traditions change the discovery timeline of these variable stars, which historians of astronomy say were discovered by Western scientists.

We see that Aboriginal people pay very close attention to subtle changes in nature, and incorporate this knowledge into their traditions. Astrophysicists have much to learn if we recognise the scientific achievements of Indigenous cultures and acknowledge the immense power of oral tradition.

Reprinted from The Conversation, with permission. This copy does not contain the pictures found in the original. The original can be accessed at [https://theconversation.com/stars-that-vary-in-brightness-shine-in-the-oral-traditions-of-aboriginal-australians-85833](https://theconversation.com/stars-that-vary-in-brightness-shine-in-the-oral-traditions-of-aboriginal-australians-85833)

'Burrmalala': Indigenous cyclone knowledge shared in Arnhem Land film

A film about Yolngu knowledge of cyclones, or Burrmalala, is launched in Arnhem Land in preparation for the coming cyclone season.


**Remote school kids get pot-to-plate veggie education**

*By Ellie Turner*

Charles Darwin University researchers are helping to promote growing fresh produce and educating kids about nutrition with a vegetable garden project in a remote Northern Territory community.
Ancient Aboriginal burning techniques return to Cape Barren Island to regenerate the land

By Natalie Whiting

On a clear day on Cape Barren Island, Truwana Rangers check the moisture levels in the ground and wind speeds before carefully lighting sections of a scrubby patch of land beside a hill overlooking the coast of their island home.


PISA 2015 results: Epistemic beliefs about science, by Indigenous background

“Figure 7.28 presents Australian students’ epistemic beliefs about science by demographic characteristics. Indigenous students reported showing significantly more knowledge of how science beliefs are constructed than the average for all OECD countries.”

![Figure 7.28](http://ijme-journal.org/index.php/ijme/issue/view/43)

From page 241, PISA 2015: Reporting Australia’s results

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**RESOURCES**

**International Journal of Multicultural Education**

We are pleased to announce that the International Journal of Multicultural Education has just published its latest issue at http://ijme-journal.org/index.php/ijme.

We invite you to browse the Table of Contents and then visit our web site to read and cite articles that interest you.

Thank you for your continued interest in IJME.

Articles (Peer-reviewed)

"Let His Voice Be Heard": A Community's Response to Inclusion of an Indigenous Counter-Narrative in the District Curriculum (1-22)  Glenda McCarthy, Christine Rogers Stanton

Pathway to the President: The Perceived Impact of Identity Structures on the Journey Experiences of Women College Presidents (23-40)  Gloria Oikelome

Positioning of Korean Immigrant Mothers of Children with Disabilities (41-64)  Jieun Kim, Sunyoung Kim

Multicultural Ethnic Music Education in Communist China (65-84)  Wenzhuo Zhang

Praxis Articles (Peer-reviewed)

RTI for Students Presenting with Behavioral Difficulties: Culturally Responsive Guiding Questions (85-102)  Kathleen Abou-Rjaily, Susan Stoddard

Examining Graduate Student Engagement in Counseling Services with Diverse Populations in P-12 Education (103-130)  Shyrea J. Minton

SYNERGIES: Walking Together - Belonging to Country (Australia)
Glen Stasiuk
Published on May 9, 2016

This film celebrates the remarkable similarities between Nyungar knowledge and Western science. It takes the audience through a 300 million year journey, featuring Nyungar Elder Dr Noel Nannup and Professor Stephen D. Hopper, as they walk the magnificent Swan River from its source to the ocean.

https://www.youtube.com/watch?v=aeGqTpLDYiQ


Abstract: The Synergies of Meaning Research Project, based at Kurongkurl Katitjin, Edith Cowan University, constructs a working relationship between traditional Aboriginal knowledge and Western natural and social scientific knowledge. The aim is to find ways of going forward together. One recently completed focus, Nyoongar Boodja, required the development of a collaborated timeline of the formation of Nyoongar land. Cooperative inquiry and research of narrative methods were used. Eleven eras are identified, with the focus of the first eight being land from (1) The Nyetting (The cold, dark time = Permian ice ages 350 million years ago) to (8) Wardanaak boodja (The Holocene flood, 7000 years ago). Astonishing resonances between the knowledge sets were discovered. This coincidence of Nyoongar-inherited lore with Western scientific discoveries about the evolution of Nyoongar boodja highlights the value of walking together, cross-culturally, seeking synergies of meaning.

New books
A few years ago the ISNB kindly helped me and my colleagues to advertise two call for book chapter proposals. I thought you would like to know that the books have now been published:

International Perspectives on the Theory and Practice of Environmental Education: A Reader
Editors: Reis, Giuliano, Scott, Jeff (Eds.)

• Explores different approaches to the definitions, practices and priorities of environmental education
• Proposes a holistic model of environmental education
• Promotes the inclusion of indigenous knowledge in environmental education

Sociocultural Perspectives on Youth Ethical Consumerism
Editors: Reis, G., Mueller, M., Giswhite, R., Siveres, L., Brito, R. (Eds.)

- Examines how school science curricula present consumption and consumerism through alternative and ethical lenses
- Explores the theory and practice of institutionalized sustainability education
- Critically reviews research literature on youth pro-environmental engagement


Recent papers

Abstract: We propose a process of contextualization based on seven empirically derived contextualization principles, aiming to provide opportunities for Indigenous Mexican adolescents to learn science in a way that supports them in fulfilling their right to an education aligned with their own culture and values. The contextualization principles we empirically derived account for Nahua students’ cultural cognition, socialization, and cultural narratives, thus supporting Indigenous students in navigating the differences between their culture and the culture and language of school while learning complex science concepts such as natural selection. The process of curricular contextualization we propose is empirically driven, taking culture, and socialization into account by using multiples sources (cognitive tasks to explore teleology, ethnographic observation of students’ community and classroom, and interviews with students and community members) and builds on the scholarship in Culturally Relevant Pedagogy and Indigenous Education. We used these principles to redesign a middle school biology unit on natural selection to make it more culturally relevant for Nahua students. The enactment of this unit resulted in students being engaged in science learning and achieving significant learning gains. The significance of this study lies in presenting evidence that learning science in culturally relevant ways supports the learning of challenging biology concepts. We provide evidence that Western science can be learned in ways that are more aligned with Indigenous students’ Traditional Indigenous Knowledge, thus informing the implementation of educational policies aiming to improve the quality of secondary education for Indigenous adolescents. Our proposed contextualization principles can benefit students of all cultural identities who feel that their religion, language, or traditional knowledge are not aligned with school science, facilitating their access to culturally relevant science education.


Abstract: Employing metasynthesis as a method, this study examined 52 empirical articles on culturally relevant and responsive science education in K-12 settings to determine the nature and scope of complementarity between culturally responsive and inquiry-based science practices (i.e., science and engineering practices identified in the National Research Council’s Framework for K-12 Science Education). The findings from this study indicate several areas of complementarity. Most often, the inquiry-based practices Obtaining, Evaluating, and Communicating Information, Constructing Explanations and Designing Solutions, and Developing and Using Models were used to advance culturally responsive instruction and assessment. The use and development of models, in particular, allowed students to explore scientific concepts through families’ funds of knowledge and explain content from Western science and Indigenous Knowledge perspectives. Moreover, students frequently Analyzed and Interpreted Data when interrogating science content in sociopolitical consciousness-raising experiences, such as identifying pollution and asthma incidences in an urban area according to neighborhood location. Specific inquiry-based practices were underutilized when advancing culturally responsive science instruction, though. For example, Using Mathematics and Computational Thinking and Engaging in Argument from Evidence were infrequently encountered. However, culturally responsive engineering-related practices were most often connected with these, and thus, represent potential areas for future complementarity, particularly as the United States embraces the Next Generation Science Standards. In considering innovative directions for advancing equitable science education, several possibilities are discussed in light of the findings of this study.
INDIGENOUS ASTRONOMY

Indigenous Astronomy studies @ University of Southern Queensland
Dr Duane W. Hamacher
Senior Research Fellow at Monash University
Adjunct Senior Fellow at USQ

We are pleased to announce that the University of Southern Queensland plans to offer Indigenous Astronomy studies via university accredited, online courses from Semester 1, 2018. The courses will be delivered online and can be taken as stand-alone courses or as part of a structured degree program, including the Graduate Certificate of Science (Astronomy), or Graduate Diploma of Science (Physical Sciences). They may count towards your undergraduate or postgraduate degree program if permitted by your institution.

These new study options will be developed and supported by Dr Duane Hamacher and Trevor Leaman (who is finishing his PhD with Dr Hamacher) in consultation with USQ staff. Since these studies are online they will be available to anyone, anywhere in the world. The courses can be used as electives (general education courses) and it is hoped will pave the way for more courses (and possibly full degree programs) in cultural and historical astronomy in the future.

Undergraduate: SCI3301 Science Project

(General Description) This course provides students with an opportunity to carry out research work in a situation which resembles, as closely as possible, that in which they may find themselves when they begin a career in science. Students are required to thoroughly research and plan their project in consultation with an academic supervisor and submit a detailed report on completion of the project.

Postgraduate: SCI8101 Science in Practice

(General Description) This course provides the opportunity for a student to pursue an area of study in science that will complement the other program studies. The course will consist of specialised investigations extending knowledge and skills in a certain area. The area of study chosen will be assigned after consultation with the examiner and a staff member with expertise in the area concerned. On completion of this course students are expected to have gained expert, specialised cognitive and technical skills in a body of knowledge or practice to independently analyse critically, reflect on and synthesise complex information, problems, concepts and theories. Assessment will be via an essay.

Both courses will feature selected and general readings, tutorial exercises, and a major essay on Australian Indigenous Astronomy – to be submitted as a single assessment. The course will focus on several major themes in Australian Indigenous Astronomy, including content, process, and application. Students in either course may choose between an industry project or an original research project. An industry project involves taking the knowledge you obtained in the course and applying it to developing practical, real-world outcomes such as education curricula, a museum or art exhibition, or other topics to be agreed upon by the student and instructor. SCI8101 will have additional readings and will require a longer, more detailed project essay.

More will be posted soon on the website www.aboriginalastronomy.com.au

Dr Ragbir Bhathal, Western Sydney University
Dr Ragbir Bhathal is giving an invited talk to staff of Westpac Banking in Sydney on Friday 1 December 2017. His talk is titled COOK, MABO & THE STARS OF THE TAGAI. It will discuss not only Aboriginal astronomy but also how the Stars of the Tagai (law of the sky) and Malo's Law (law of the land) were used by Mabo's people and legal team to win the Mabo case. This is a modified version of the invited talk he gave
in NAIDOC week to the Federal High Court in Sydney. The talks are to commemorate 25 years of Mabo's victory in the High Court of Australia.

He also gave a similar invited talk at the Sutherland Library on 9 November 2017. It was well attended by members of the Sutherland community. Cook's landing place at Botany Bay is within the Sutherland region.

One of the questions he recently raised at a discussion on Aboriginal astronomy is "Should the Queen of England say sorry to the Aboriginal and Torres Strait Islanders for the continent (eastern part) stolen by Captain Cook for King George III which subsequently led to the stealing of the whole continent?"

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**CONFERENCES**

**Science Educators for Equity, Diversity, & Social Justice (SEEDS) conference**  
12-14 January 2018  
University of California campus in Davis

Due to the tragic situation in Puerto Rico this fall, the Science Educators for Equity, Diversity, & Social Justice (SEEDS) conference has been fully relocated to the University of California campus in Davis and will now be held from January 12-14.

The conference will begin Friday at 6 p.m. and end Sunday by 5 p.m. The following airports are recommended: Sacramento (closest), Oakland, San Francisco

We have secured reduced rates for lodging. Both options are within walking distance of the conference site. The reduced rates expire on Dec 15, 2017:

- Hyatt Place (530) 756-9500 $154/night, $14/day parking (this one is closest to the conference site)
- Aggie Inn (480) 386-9522 $129/night, free parking

When calling to make your reservations, please quote the reduced rate and let them know you are attending the SEEDS conference at UC-Davis. Thank you for your continued support to this effort to bring together those interested in social justice in science education. If you would like to attend and have not yet registered, you may do so here:

http://seedsweb.org/Pay/index.html

We look forward to seeing you there!

SEEDS Steering Committee  
http://seedsweb.org/page2/index.html  
seedswebspace@gmail.com

**Australasian Science Education Research Association 2018 Conference**  
26-29 June 2018  
Gold Coast, Queensland

Join us at the Surfers Paradise Marriott on the Gold Coast, 26-29 June 2018, for the ASERA annual conference. Enjoy connecting with colleagues in science education, sharing your own research and learning from others.

https://www.asera.org.au/conference
CONASTA 67: Spotlight on our future
8-11 July 2018
University of Sydney, NSW

We would like to invite you to participate in CONASTA 67, the annual science education conference of the Australian Science Teachers Association (ASTA). In 2018 CONASTA will be hosted by the Science Teachers Association of New South Wales (STANSW) and held at the University of Sydney from 8-11 July.

The CONASTA 67 theme of 'Spotlight on our future' has been chosen to inspire all educators to focus on the influence of science on our lives. CONASTA 67 will celebrate the successes of science, particularly Australian science, and will explore the vital role of science in our future.

As the major science education event in Australia, CONASTA has a strong reputation for offering high quality and stimulating professional learning experiences for science teachers, school laboratory technicians/managers and others with an interest in science education. Our delegates include representatives from all Australian states and territories, government and non-government schools, all years of schooling and from metropolitan, rural and remote locations.

ASTA and STANSW are committed to delivering a conference that meets the essential need for engagement, professional development and support amongst science teacher and laboratory technician communities. The vital role of Science, Engineering, Technology and Maths (STEM) in Australia's future is unquestionable, and the foundation of STEM excellence rests with Australia's STEM educators.

**Call for workshop abstracts - NOW OPEN**
If you have ever wanted to present a workshop at a national conference to your peers, now is the time to apply. Call for abstracts is open till 15 December. Workshops are presented by teachers, researchers and science professionals, and cover a broad range of topics including primary and secondary science education; laboratory technician skills and practices; new science and science education research; curriculum implementation and support; and teaching resources and innovations. To submit an abstract for CONASTA 67, please click [HERE](http://asta.edu.au/conasta).

Igniting knowledge sharing: World Indigenous Research and Education Conference
22-24 August 2018
Guovdageaidnu/Kautokeino, Norway

On behalf of Sámi allaskuvla/Sámi University of Applied Sciences and World Indigenous Research Association, we would hereby like to invite you to 2018’s World Indigenous Research and Education Conference August 22th - 24th in Guovdageaidnu/Kautokeino, Norway.

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 interpreted as an endorsement of the conference.

2017

December
11-17 December: American Geophysical Union Fall Meeting, New Orleans, LA. PA017: Native Science: How Indigenous Perspectives Inform Environmental Science and Policy
https://agu.confex.com/agu/fm17/preliminaryview.cgi/Session26060 (Aug17)

2018

January
12-14 January: Science Educators for Equity, Diversity, & Social Justice (SEEDS) conference, University of California campus in Davis (http://seedsweb.org/Pay/index.html) (Dec17)

March

June


July

August

29 August – 1 September: Society for Social Studies of Science (4s) Annual Conference, Sydney International Convention Centre (https://4s2018sydney.org/translations/) (Oct17)

Best wishes for Christmas and the New Year, particularly to our contributors,

Michael and Femi