



# Identifying Indigenous Astronomy Knowledge Systems in “westernised” indigenous communities

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# Introduction to SARAQ

- SARAQ is a national facility of the National Research Foundation (NRF), responsible for supporting and implementing South Africa's strategic investments in radio astronomy, particularly:
  - MeerKAT Radiotelescope
  - Square Kilometre Array Radiotelescope (SKA-MID)
- Strategic direction provided through the South Africa SKA Steering Committee (SASSC), chaired by the Director-General: DSI
- Mission
  - To establish South Africa as a global leader in radio astronomy and associated technologies and disciplines by successfully hosting, and participating in the design and construction of the SKA telescope and other radio astronomy and geodesy facilities



# Purpose of science engagement

To create a stimulated and engaged South African society that is inspired by and values scientific endeavor, critically engages with key science and technology issues

**Strategic Aim 1:** To popularise science, engineering, technology and innovation as attractive, relevant and accessible in order to enhance scientific literacy and awaken interest in relevant careers.

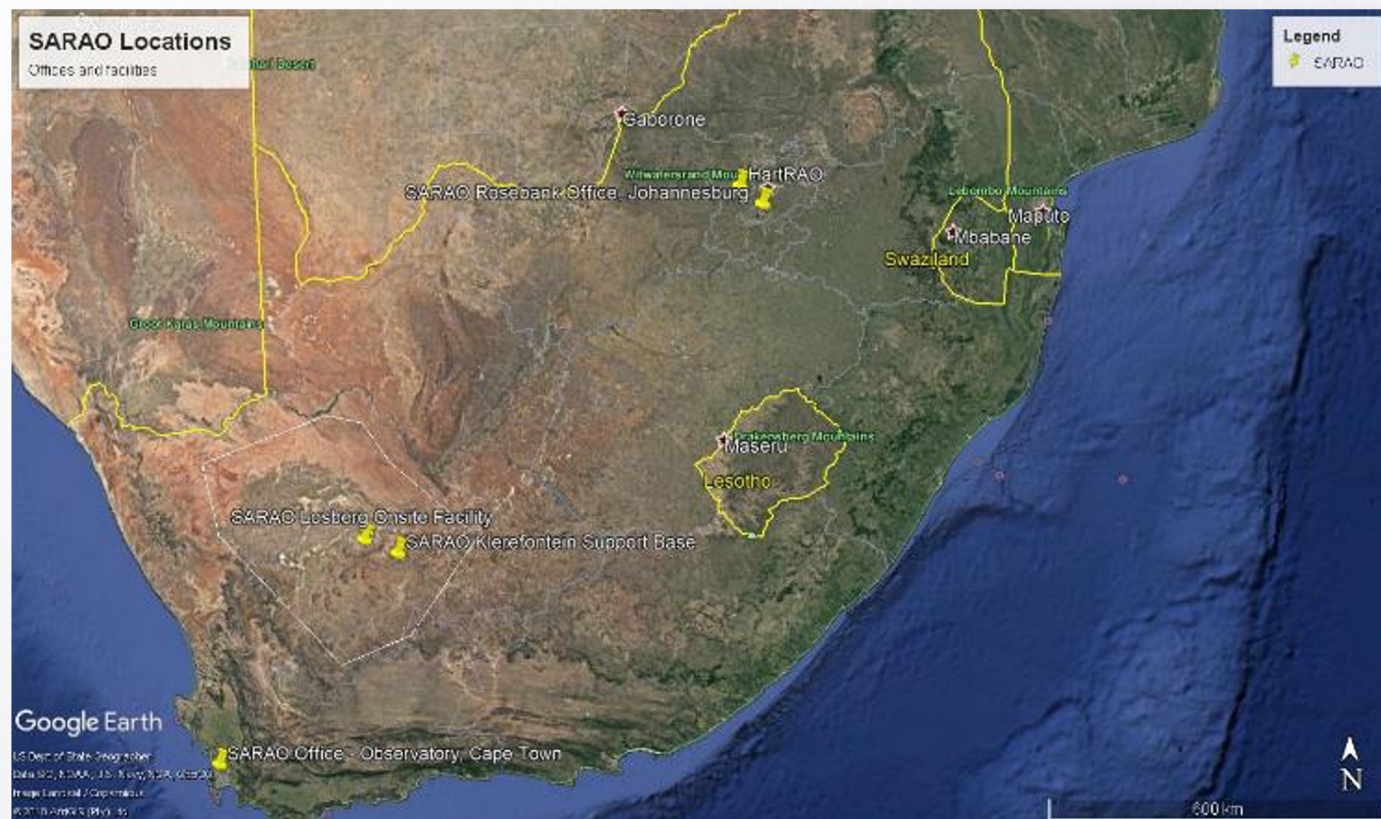
**Strategic Aim 2:** To develop a critical public that actively engages and participates in the national discourse of science and technology to the benefit of society.

**Strategic Aim 3:** To promote science communication that will enhance science engagement in South Africa.

**Strategic Aim 4:** To profile South African science and science achievements domestically and internationally, demonstrating their contribution to national development and global science, thereby enhancing their public standing.

# Social licence to operate

# Sites: Science Engagement



IKS



# SKA and Indigenous Knowledge Systems (IKS)

- At the launch event in 2018, a blessing ceremony was conducted by indigenous people that used to be from the area. This illustrates a clear acknowledgement of the social context in which this project is physically located.
- It also touches on the concept of co-production as popularised by Sheila Jasanoff (2004) in her continuous study on science and society. That illustrates the trajectory of co-production, co-creation, and co-evolution of science and technology throughout history and the modern era.



# Myths (Some People hold True)

- **Indigenous Astronomy**

There is a single Indigenous knowledge

Romanticizing Indigenous science

Lots of Indigenous knowledges

- **Western Astronomy**

There is one way of viewing the world

Seeing western science as the only way of knowing and making sense of our reality

Not appreciating that IKS contributed to the development of Western astronomy

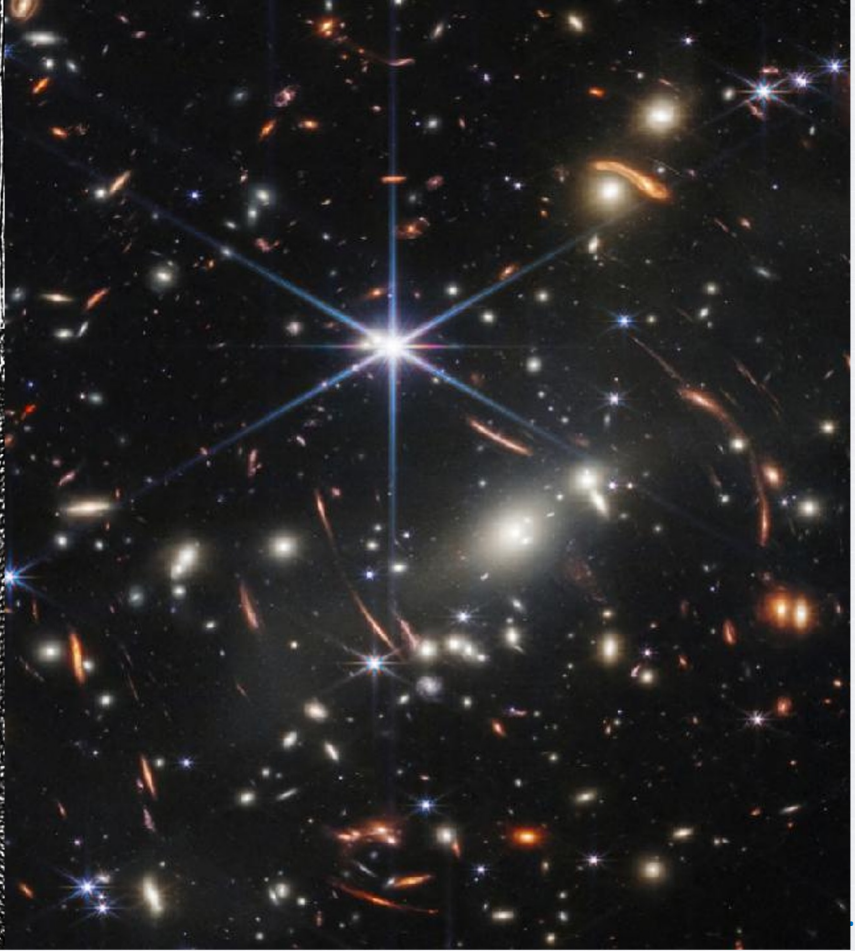
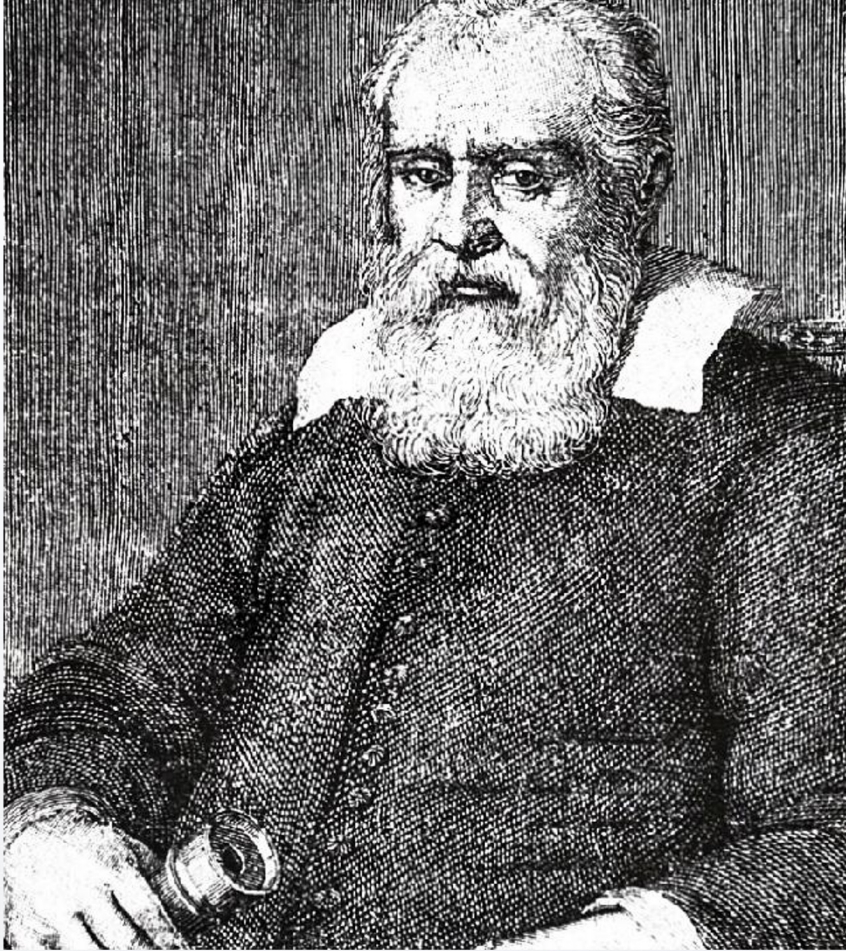
Galileo vs Copernicus

# Value of more than one story, Co creating meaning

- There is more than one story
- Through this process we are co-creating meaning
- <https://www.youtube.com/watch?v=D9lhs241zeg>



# Why this Workshop?





IG:@korata33

From this...

To this...

We have come a long way!!!

# My questions about this image?

- So do you really think astronomy started with Galileo Galilei?
- What traditions and history influenced Galileo Galilei?
- How were these beliefs and knowledge informed?
- Babylonian, Greek, Aristotle, Copernicus?
- How did this influence his religion?
- If Galileo practiced his science in the Australian Outback or the Central Karoo in 1610, how would this have been different?



Galileo's observations on the Pleiades



Nebula of Orion



Nebula of Praesepe

# Shared skies



**What people believe about the stars is critical to understand in Science Engagement. Being sensitive to what other cultures understand regarding the Stars will determine to a large extent your social license to operate.**





# Methodology used for this workshop

- Adapted Ethnoastronomy

The term 'cultural astronomy' (Ruggles & Saunders 1993; Iwaniszewski 1994) has been used widely since the 1990s to encompass both archaeoastronomy and ethnoastronomy.

Using a variety of techniques, are the ways in which human societies construct their knowledge and practices concerning the sky and its phenomena (Iwaniszewski 1990, 1991).

# So why “westernized” indigenous communities

Certain Indigenous communities gets absorbed into westernized cultures for several reasons:

- Survival
- Education
- Colonization
- Slavery
- Genocide
- Globalization
- Global warming

# So are these peoples considered “western” and is the traditional astronomy dead?

- In a study I did for PCST in 2018, I found that the stories that were told by the San People approximately 5000 years ago are still related and often used in some communities that do not actively identify as San decedents.
- This was the case for other branches of San Indigenous knowledge as well
- A medicinal plant study was conducted in collaboration with UJ and the San Council. The study provided the basis for this workshop seeing as indigenous people may live in westernised communities, however, it does not necessarily mean that their understanding of the cosmos is western-based.

## wildekeur • kalkoenbos • sutherlandia

### *Lessertia frutescens* (= *Sutherlandia frutescens*)



Wildekeur, kalkoenbos (*Lessertia frutescens*, Bushmanland ecotype/Boesmanland ekotipe): leaves, flowers and fruits/ blare, blomme en vrugte.

This variable shrub can be easily recognised by the compound leaves, bright red flowers and inflated pods. There are two different growth forms (subspecies) – small and prostrate (sometimes regarded as “female”) and long and erect (“male-” or “long-leg” *wildekeur*).

Few other plants have a larger diversity of recorded medicinal uses (and vernacular names!) than this one. It is a bitter tonic that is used in all parts of Bushmanland for blood cleansing and almost all ailments, including diabetes, high blood pressure, stomach pain, back pain, colds and flu, coughs, diarrhoea, kidney and bladder troubles, female ailments (e.g., cleansing of the womb), and both as prophylaxis and as symptomatic treatment of cancer. It is also commonly used as an ingredient of herbal mixtures.

*Wildekeur* has a wide distribution in South Africa.

**24. *Lessertia frutescens* (L.) Goldblatt & J.C.Manning**

**Fabaceae**

wildekeur, kalkoenbos, kalkoentjie, kalkoentjiesbos, kloekoeloekbos, klappiesbos, kankerbos, willekeur, gansie (Afrikaans); cancer bush, sutherlandia (English)

Hierdie variërende struik kan maklik herken word aan die saamgestelde blare, helderrooi blomme en opgeblaaide peule. Daar is twee verskillende groeivorms (subspesies) – klein en platgroeënd (soms beskou as die “wyfie”) en lank en regop (“mannetjie-” of langbeen-wildekeur).

Daar is min plante met ’n groter verskeidenheid van medisinale gebruike (en volksname!) as hierdie een. Dit is ’n bitter tonikum wat in alle dele van Boesmanland gebruik word vir bloedsuiwering en bykans alle kwale, insluitende suikersiekte, hoë bloeddruk, maagpyn, rugpyn, verkoue en griep, hoes, maagwerk, nier- en blaasprobleme, vrouekwale (bv. skoonmaak van die baarmoeder), en beide as voorbehoedmiddel en simptomatiese behandeling van kanker. Dit word ook algemeen gebruik as bestanddeel van kruie mengsels.

Wildekeur het ’n wye verspreiding in Suid-Afrika.

## USEFUL PLANTS OF BUSHMANLAND An Ethnobotanical Survey

**Useful Plants of Bushmanland** is an inventory and analysis of all the plant species that are locally used for food, medicine and miscellaneous purposes. Rural people of the region have provided us with fascinating data on the uses of plants, which we have summarized, interpreted and analysed in a modern botanical context.

The data are of global significance, because it describes the ethnobotany of the original home area of the /Xam people, known to represent the most ancient lineage of modern humans.

The contemporary uses of plants provide a glimpse of the way in which our ancestors treated ailments with medicinal plants (by prolonged chewing, as masticatories) and how food plants were eaten *in situ*, on daily foraging excursions.

Of special interest are the magical and ritual uses of plants, that have persisted to this day. These uses often appear to be irrational, but closer inspection reveals a link to psychological and mind-altering effects, and as such perfectly understandable in the context of a people who were unable to explain natural phenomena such as thunder, lightning and disease in a modern "scientific" way, as we can do today.

The need to record and preserve indigenous knowledge about nature is now accepted amongst conservation-minded people as an urgent priority, because it is not only species that are going extinct, but also languages and cultures. What makes this study unique is that it represents an extreme example of the impact of technology on the lives of rural people, in this case the highly advanced Square Kilometre Array, which represents elaborate and sophisticated international technology to explore the universe through radio astronomy. The remote southern Bushmanland region was an ideal choice to place hundreds of antennas because of the low radio wave interference but came at a cost in terms of the preservation of local knowledge about nature. While the antenna discs are looking outwards, the authors found ourselves on a fascinating journey of introspection.

This book hopefully makes a contribution to the preservation of all aspects of indigenous plant use knowledge of Bushmanland for the benefit of the next generations, not only as a precious cultural treasure to empower and inspire all people and marginalised local people in particular, but also as a potential source of information for socio-economic developments and new innovations in the future.

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USEFUL PLANTS OF BUSHMANLAND  
An Ethnobotanical Survey

Josef de Beer & Ben-Erik van Wyk



















## USEFUL PLANTS OF BUSHMANLAND An Ethnobotanical Survey



Josef de Beer & Ben-Erik van Wyk

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67

















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69

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68

# All Knowledge as Indigenous knowledge

Science and technology studies as a subject field pointed out that all knowledge, including scientific knowledge, is specific to its cultural context.

Therefore all knowledge could be considered Indigenous

# Identifying IKS in “Western” Contexts

- Be sensitive as some concepts are considered “sacred” and needs to be approached accordingly
- Identify known concepts and that are of interest
- Identify workshop participants
- Introduce items/concepts/discussion topics
- Present the item and introduce the discussion
- Document/Check
- Make available to the community
- Acknowledge the owners



# Practice guiding questions:

- Do you know these stars?
- What do you call them?
- What are their significance?
- Where do you think they come from?
- Does it announce anything?
- Where did you learn about this?
- Where do you think the person you learned from learned about this?

# Giving it a name

- Remembering Astronomy

Co-creation

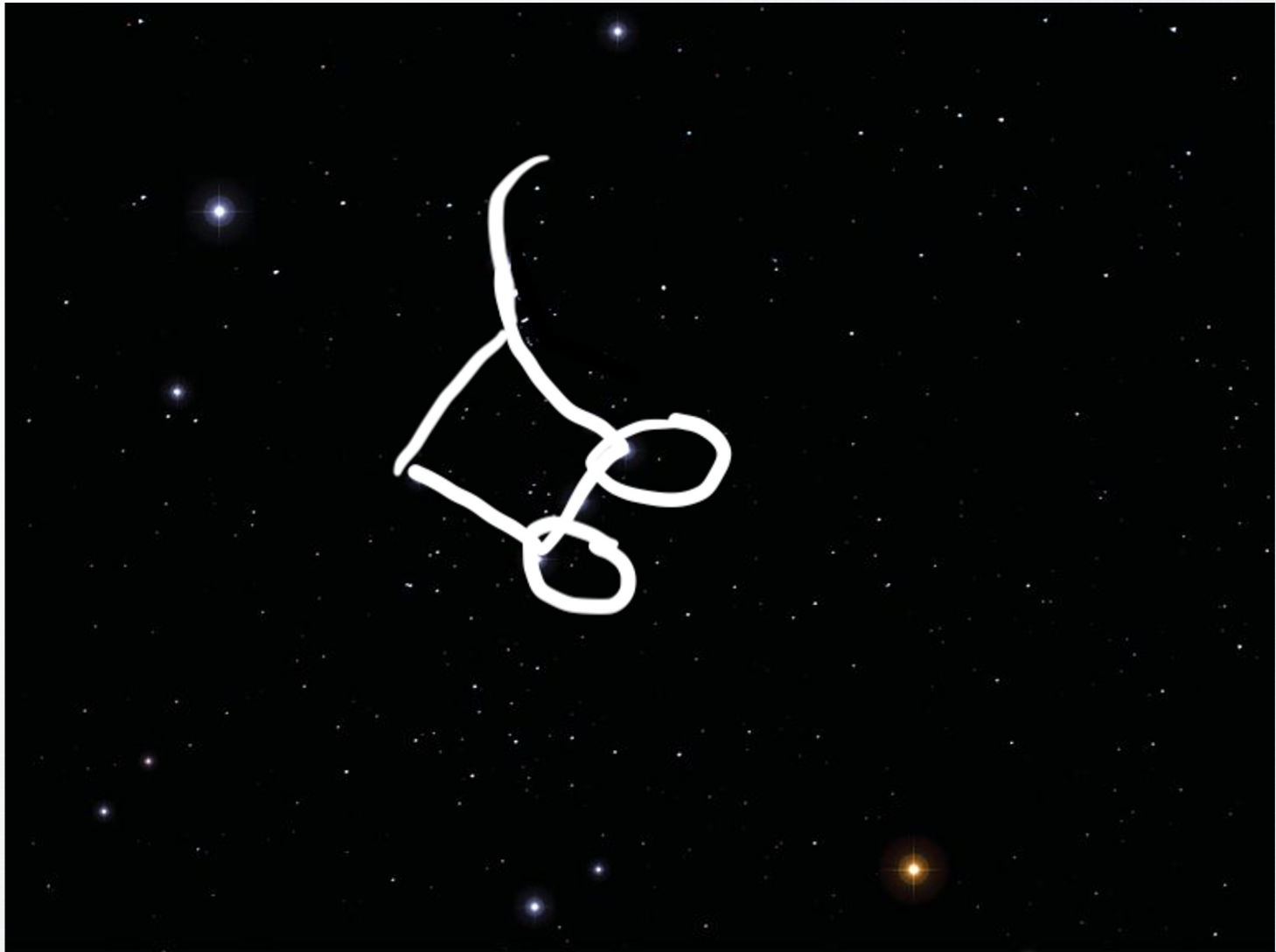
Re-assembling concepts

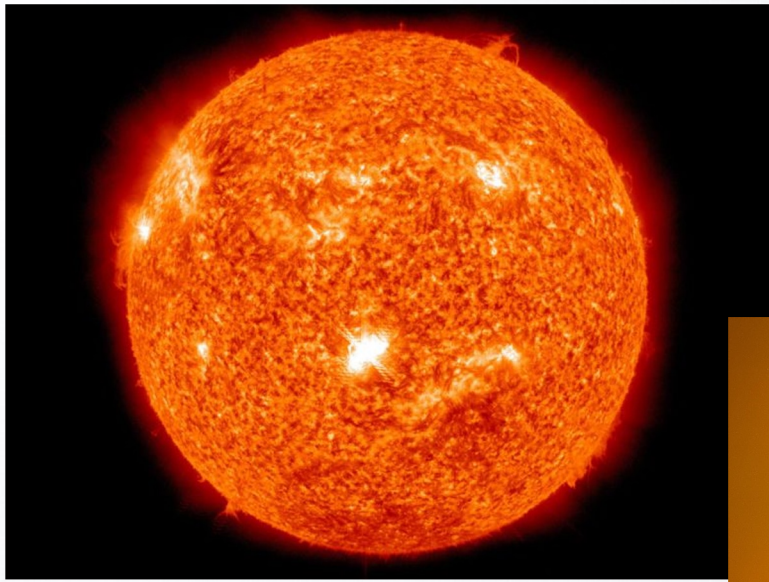
Creating new and accessible concepts

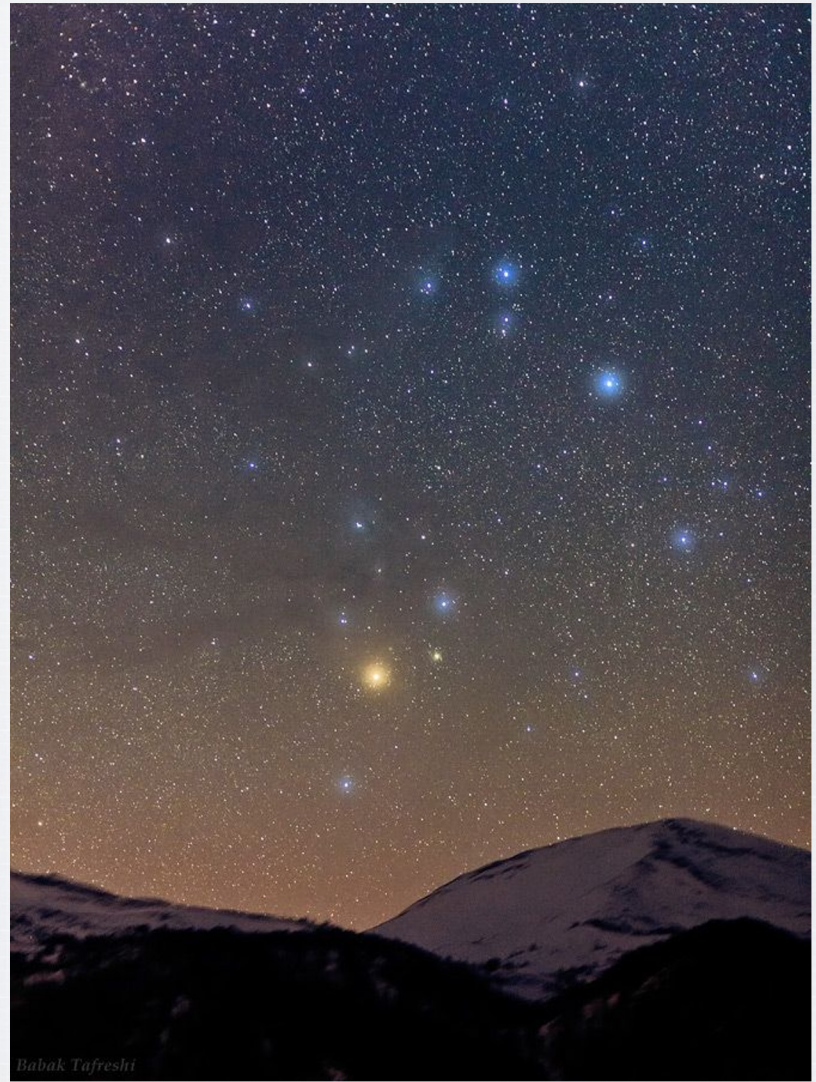
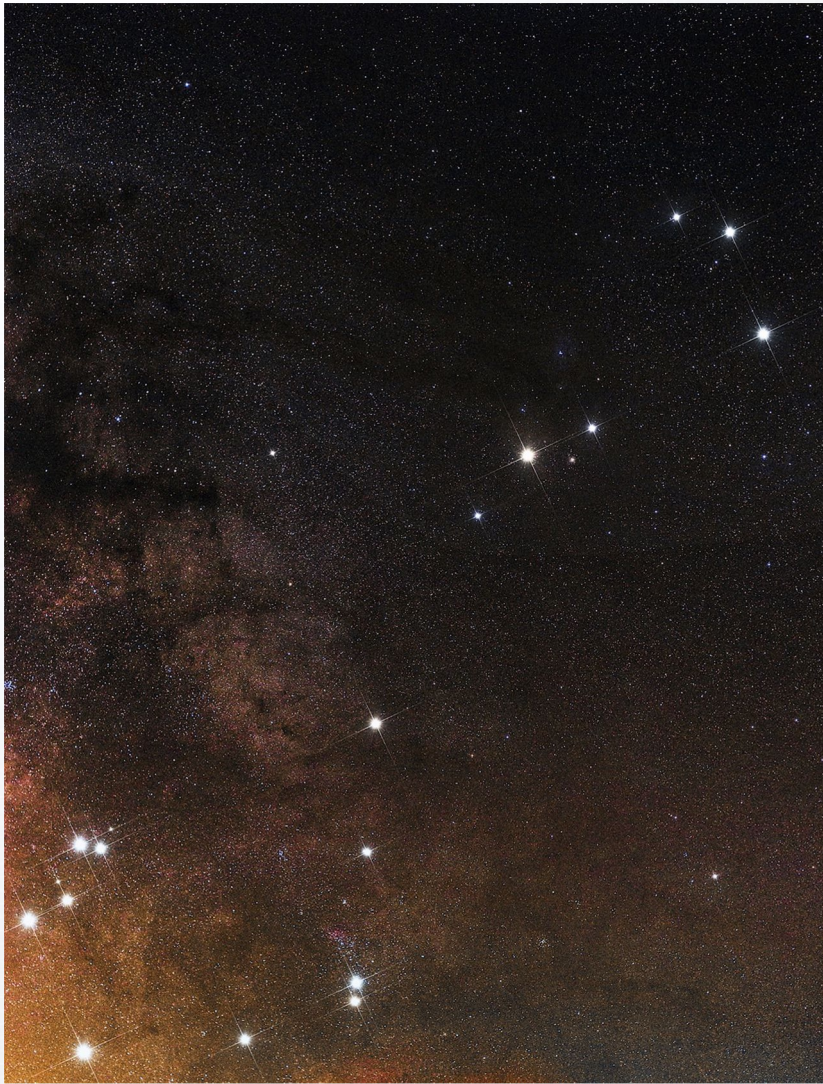
Acknowledging different stories in “Indigenous” and “Western”  
Astronomy

# Practice









*Babak Tafreshi*

# Discussion

- What could be added?
- How could this be used to tell multiple stories?
- How could Astronomy projects be more sensitive to indigenous knowledge?
- What gaps could be filled through doing this?
- How does this impact science engagement?
- What can Science engagement benefit through similar processes?

# MeerKAT

MeerKAT DEEP2 (Mauch et al. 2020)

The most sensitive radio image  
ever made of its kind

