Annual Report WGSN 2021

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WGSN Chair: Susanne M Hoffmann (Germany)
WGSN Secretary: Eric Mamajek (USA)
WGSN Etymology Task Group Lead: Doris Vickers (Austria)
WGSN IAU Websites:

- https://www.iau.org/science/scientific_bodies/working_groups/280/
- http://exopla.net/approved-star-names/

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Description

The IAU Division C Working Group on Star Names (WGSN) consists of an international group of astronomers with expertise in stellar astronomy, astronomical history, and cultural astronomy who research and catalog proper names for stars for the use by the international astronomical community and also to aid the recognition and preservation of intangible astronomical heritage[1]. WGSN maintains the IAU Catalog of Star Names. The focus during the 2021-2024 triennium will be: (1) to continue an exhaustive search of star names from the cultural astronomy literature, (2) to adopt new IAU proper names for stars of scientific and historical value for community use following WGSN guidelines, (3) to provide relevant expertise to support other IAU efforts related to celestial nomenclature, including public naming campaigns (e.g. NameExoWorlds). Anticipated Outputs of the WGSN are (1) to maintain the IAU Catalog of Star Names (https://www.iau.org/public/themes/naming_stars/) and assist the IAU with maintaining its web content on celestial nomenclature, (2) to add etymological and ethnological information to the IAU Catalog of Star Names in the interests of further preserving astronomical heritage, (3) to construct a new supporting list or name bank of names for stars and associated asterisms which is culturally and geographically diverse, (4) to refine WGSN guidelines for the proposal and adoption of names for stars.

This annual report covers activities during 2021 and early 2022.

[1] https://www.iau.org/science/scientific_bodies/working_groups/280/.

Business Matters

Status of Affiliates: The topic of historical and cultural celestial names benefits from expertise beyond that of IAU members, and hence affiliates are of special importance to WGSN. The WG members approved measures allowing affiliates to run for election to lead WG task groups and to vote on subject matters (e.g. adoption of names). To this end, in 2021 the WGSN created a new Etymology Task Group, and affiliates participated in the discussion and voted on a batch of star names discussed in early 2022.

Elections: WGSN held elections in 2021 and elected a new president - Susanne Hoffmann. Former president Eric Mamajek was elected WG secretary. Doris Vickers was elected to the new role of Etymology Task Group lead. WGSN is also hoping to organize an Indigenous Names Task lead, and while a single task lead was not elected - experts on Indigenous star names are encouraged to reach out to Javier Mejuto, Alejandro López, and Duane Hamacher to help with researching Indigenous star names.

Scientific/Technical Progress in Exploring Ancient Skies

Constellation Patterns: A study was published in the journal *Psychological Science* (with a comment in *Nature Astronomy*) by a team of psychologists and an astronomer (WG member Duane Hamacher) at the University of Melbourne in Australia (Kemp et al. 2022) trying to make sense of why constellation patterns are seen in such remarkably similar ways by cultures across the world today and in ancient times. 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. This research compiles data from 27 cultures around the world and shows that a simple computational model of perceptual grouping accounts for many of the recurring cross-cultural asterisms, suggesting that basic perceptual principles account for more of the structure of asterisms across cultures than previously acknowledged and highlights ways in which specific cultures depart from this shared baseline.

Constellations: A fundamental study of which of the IAU constellations have Babylonian roots and where Babylonian star names could be applied was published in German by Hoffmann (2021). The book with many illustrations could be a guide for communicating astronomical intangible heritage to the public. Jessica Gullberg painted Babylonian constellations for the Stellarium desktop planetarium software with supervision of Steven R Gullberg and Susanne M Hoffmann. The new paintings were published in the Stellarium software release in September 2021. Additionally, two further Greek sky cultures (historical paintings and drawings of ancient constellations) were published simultaneously in Stellarium.

South American Studies: WG member Alejandro López is co-author of an article ("Cosmo-Logics in Contemporary Lowland South America") referring to the analysis of common axes in the modes of organization of the profound logics of the models of the cosmos of South American aboriginal groups. The work seeks to establish ethnographically based comparisons to build grounded theory. He is also author of a chapter (López 2021) that explores the alternative sense given by the Moqoit of the Argentine Chaco to what from "Western" astronomy are usually understood as celestial objects and phenomena.

New findings on ancient star names: The commonly used official star names Capella and Canopus, and possibly also Arcturus, might refer to old Egyptian constellations that became obsolete in the "new" Greek uranography in the post-Alexander the Great era. The peer-reviewed paper on this finding is accepted (Hoffmann 2022, in print). These new findings might indicate that there were similar efforts in the multicultural ancient world as we are undertaking in the globally operating IAU: constellations of individual (indigenous) cultures are inserted as star names into the new constellation culture.

Book on Global Indigenous Astronomy: A new trade (popular) book, co-authored with six First Nations Elders, written by WG member Duane Hamacher, examines the scientific layers of traditional star knowledge (Hamacher with Elders & Knowledge Holders 2022). *The First Astronomers* examines the scientific layers with respect to the Sun, Moon, planets, seasonal stars, twinkling stars, variable stars, cataclysmic stars, navigation and star maps, meteorites, and more. All royalties of the book go to charity.

Splinter Session: In summer 2021, Hoffmann and the president of Commission C4 "World Heritage and Astronomy", Gudrun Wolfschmidt, organized a splinter meeting at the annual meeting of the German Astronomical Society (AG) in September 2021. The meeting was held on three of the five conference days (Sept. 14,15,16). Several WGSN members participated (Doris Vickers, B.S. Shylaja, Steven R. Gullberg) and there will be proceedings - likely published later in 2022. Here is the abstract of the meeting:[2]

> *There are many ways and styles of astronomical research: telescopic observations, glass plate archives, evaluating historical star charts, computation and simulation of historical phenomena etc. As there are many different cultures of astronomy, astronomy has a strong impact on human cultures. Creating constellations as a cultural frame of reference as a tool for orientation in space and time is only a first step towards a systematic usage of celestial phenomena in human societies. The selection of outstanding view points for observations, the building of observatories and development of instruments for astronomical observations are further aspects.*
> *In particular, the IAU Division C, Commission C4 "World Heritage & Astronomy" identifies the cultural and astronomical values in a comparative analysis in order to assess the "Outstanding Universal Value" of observatories and archaeoastronomical sites with the aim to be nominated for inscription on the Unesco "World Heritage List" or*

[2] https://ag2021.astronomische-gesellschaft.de/view_splinter.php?session=Culture

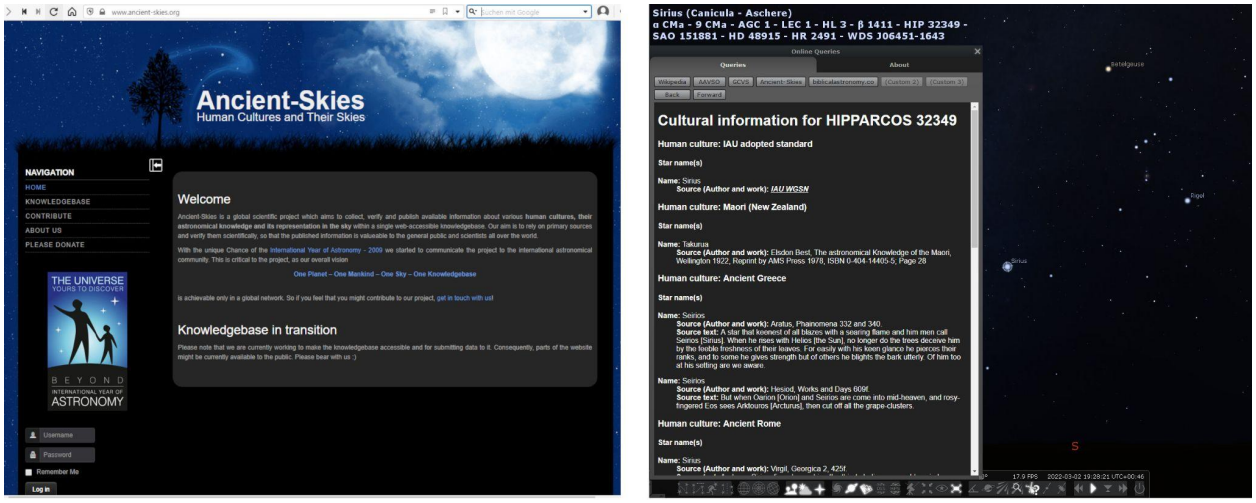
on the "Outstanding Astronomical Heritage" (OAH) list. It also considers dark sky qualities of modern observatory sites. The IAU Division C Working Group "Star Names" does research on, and makes catalogues of proper names for, stars for the use by the international astronomical community and also to aid the recognition and preservation of intangible astronomical heritage. Both research associations aim to document, preserve and communicate heritage - material culture (tangible) as well as intellectual (intangible) heritage.

In this splinter, we would like to collect analyses of different habits and activities within the community of astronomers, namely the cultures of astronomy. Focus will be on analysing various data-sets to gain insight into particular "astronomer's cultures" and their influence on the culture of the surrounding society as well as on the astronomical community.

Reactivating Ancient Skies: To facilitate the recording of cultural star names, WGSN members reactivated the old database project that had been launched in Vienna, Austria, 2009 (IYA), the Ancient Skies database: https://www.ancient-skies.org The following steps were performed:

1. Doris Vickers re-entered and revisited the Greek and Roman star names and etymologies that had been entered a decade ago.
2. The development team of the free planetarium software Stellarium implemented a plugin to query the ancient-skies.org database from inside Stellarium.
3. Two conference talks were given (by D. Vickers and G. Zotti as first authors) at the above-mentioned conference (AG) and at the conference of the Société Européenne pour l'astronomie dans la Culture (SEAC) in order to invite more experts on historical and indigenous star names to contribute their data. Both conferences will have proceedings and publish open access.
4. B.S. Shylaja already agreed to include her Indian star name data presented at one of these conferences in the database. S.Hoffmann started to compile lists of Babylonian star names. These lists and others stored in the Stellarium GitHub repository (in particular the Arabic ones, contributed by the passionate senior researcher Khalid AlAjaji) will be entered into the database soon.
5. There are fields for "references/ sources" for the information that is stored. From the ethnological point of view, it is proposed to include fields in the database that allow a more adequate characterization of the contributions of cultures with a strongly oral tradition (name of the interlocutor, locality, people/culture, language, date).

Based on this initiative, we hope to invite more members of the WGSN to contribute to the database in order to make their culture's star names accessible and visible for everybody (educators, researchers, interested laypeople). Possibly, this is an attractive way for acquiring more associate members for the WGSN.



Current look of the ancient-skies.org database (left) and the Stellarium plugin (right) for querying this information: the technical development of the website query tool is still work in progress but shall be completed within the next few months. Uploading data is already possible.

Additions to the IAU Star Name List

WGSN maintains the IAU Catalog of Star Names on the IAU website https://www.iau.org/public/themes/naming_stars/, in accordance with its Terms of Reference and service role identified called out in the IAU Strategic Plan 2020-2030 ("*The IAU serves as the internationally recognised authority for assigning designations to celestial bodies and their surface features. To do so, the IAU has a number of Working Groups on various topics, most notably on the nomenclature of small bodies in the Solar System and planetary systems under Division F and on Star Names under Division C.*"). Although the past few years have focussed mainly on researching new names and etymologies, in early 2022 a list of star names was proposed for adoption by the WG for the IAU Catalog of Star Names: It provided several eponymous names from the 19th and 20th centuries - names for astronomers that first discovered or researched the unusual nature of some stars. The famous example "Barnard's Star" was reviewed and adopted with no objections back in 2017, however discussion then did not crystallize on how to handle future cases of eponymous names and none were considered further until early 2022. The amount of usage of the names in the astronomical literature ranges widely, and some that are in the SIMBAD database are basically one-off names that never really took hold in the literature.

There was a broad sense among the WGSN members that 1) the assigning of new eponymous names in astronomical publications should be discouraged, 2) the WGSN is unlikely to adopt eponymous names in the future for bright stars, or only in very rare special cases, but some eponymous names for faint stars that satisfy some TBD criteria may be adopted for the IAU Star Name catalog in the future. Although there were majority 'yes' votes for adopting some of the eponymous names for the IAU Star Name list, the discussion led to broader agreement among the WG that guidelines for considering eponymous names for approval should be decided upon

first before reconsidering them by individual votes. Hence, no further eponymous names were approved yet as of March 2022. However two additional names were approved - the historical name Rana for the bright star designated δ Eridani, and the late 20th century name Geminga which was the long-standing nickname for the famous pulsar PSR B0633+17.

Name	**ID**	**mag**	**Earliest known occurrence**		**Notes**
Rana	δ Eri	3.5	Piazzi	1814	From “Rana Secunda”, Latin for “2nd frog” from indigenous Arabian tradition, apparently misappropriated for Palermo catalog (Kunitzsch 1959). Shortened “Rana” appeared in Becvar (1951) and Bright Star Catalog (Hoffleit & Jaschek 1982).
Geminga	PSR B0633+17 (pulsar)		Maraschi, L.; Treves, A.	1977	Nicknamed from *portmanteau* of *Ga*mma-ray source in *Gemin*i, and "Geminga", but also means "doesn't exist" or "it's not there" in Milanese dialect (Bignami et al. 1983).

Given the additional research on cultural and historical star names by WG members in recent years, and the new technical resources (ancient-skies.org and Stellarium GitHub repositories) to tracks names across sky cultures, the WG may consider some additional names for the IAU Star Name catalog in the near future.

References and Talks

Bignami, G. F. ; Caraveo, P. A.; Lamb, R. C. (1983), “An identification for "GEMINGA" (2CG 195+04) 1E 0630+178 : a unique object in the error box of the high-energy gamma-ray source.” Astrophysical Journal, Vol. 272, p. L9-L13

Hamacher, D.W. with Elders & Knowledge Holders (2022). *The First Astronomers, how Indigenous Elders read the stars*. Allen & Unwin, Sydney (Australia).

Hoffleit D. & Jaschek, C. (1982), The Bright Star Catalog. Fourth revised edition. (Containing data compiled through 1979)., New Haven, CT (USA): Yale University Observatory

Hoffmann, S.M. (2021), Wie der Löwe an den Himmel kam – Auf den Spuren der Sternbilder, Franckh Kosmos, Stuttgart

Hoffmann, S.M. (2021). Historical Constellations in the Planetarium. Proceedings of the International Astronomical Union, Vol. 15, Symposium S367: Education and Heritage in the Era of Big Data in Astronomy, December 2020, Cambridge University Press, 474–475.

Hoffmann, S.M. (2021): Reconstruction of ancient constellations in the planetarium dome, The Planetarian, June, p. 12-20; cont. p. 74

Kemp, C.; Hamacher, D.W.; Little, D.R. and Cropper, S. (2022) Perceptual Grouping Explains Similarities in Constellations Across Cultures. *Psychological Science,* doi:10.1177/09567976211044157

Kemp, C.; Hamacher, D.W.; Little, D.R. and Cropper, S. (2022) Comparing constellations across cultures. *Nature Astronomy*, DOI: 10.1038/s41550-022-01642-x

López, A. (2021). “Signs, Not Phenomena: Moqoit Cosmo-politics and Alternative Experiences of the Sky”, in: Advancing Cultural Astronomy. Studies in Honour of Clive Ruggles. Boutsikas, Efrosyni, McCluskey, Stephen C., Steele, John (Eds.), Springer International Publishing, Cham, Switzerland, pp. 71-104

López, A. (2021). “Cosmo-Logics in Contemporary Lowland South America.” Journal of Skyscape Archaeology, 7(2), 269–297

Maraschi, L. ; Treves, A. (1977), “On the gamma-ray source CG 195+4 (Geminga)”, Astronomy and Astrophysics, vol. 61, no. 2, Oct. 1977, p. L11-L13.

Conference-Talks **on star names** by WGSN members:

Adams, Danielle. Two-Eyed Seeing: Arabian Indigenous Astronomy, May 14.
https://www.nativeskywatchers.com/two-eyed-arabian&stardust.html

Adams, Danielle. NASA’s Universe of Learning Science Briefing: Multicultural Perspectives on Astronomy, October 7.
https://universe-of-learning.org/contents/events/science-briefings/science-briefing-multicultural-perspectives-on-astronomy/

B S Shylaja: Star names in Indian culture - a search leading to their evolution, September 14

Venketeswara Pai R: Star Names in Sanskrit Astronomical literature, September 15

Vickers, Doris: Ancient Skies and Stellarium - making cultural astronomical information easily accessible, Sept. 16