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DIVISION C / WORKING GROUP STAR NAMES

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TRIENNIAL REPORT 2021-2024

1. Background

WG Star Names (WGSN) was first approved as an IAU Working Group by the Executive Committee and Division C in May 2016 and has become a functional working group. Its formation was spurred by discussions by the IAU EC WG Public Naming of Planets and Planetary Satellites when the IAU's early efforts to name exoplanets and their host stars via public naming campaigns (NameExoWorlds 2015) exposed the lack of IAU policy regarding the standardization of star names (Montmerle et al. 2016). With support from then IAU General Secretary Thierry Montmerle, and initially chaired by Eric Mamajek, WGSN was formulated as an new opportunity to support the IAU in *preserving* intangible astronomical heritage, *standardizing* nomenclature for a class of celestial objects which had been surprisingly overlooked for a century (stars), *diversifying* the pool of IAU-recognized star names beyond traditional Latinized Arabic/Greek names in common use, and better *preparing* the IAU for public naming campaigns for exoplanets and their host stars by cataloguing historical and cultural star names first. Further details on the WGSN's early activities are compiled in the 2015-2018 and 2018-2021 triennial reports.

The following Terms of Reference for the IAU functional Working Group Star Names was approved by Division C to guide its activities during the past triennium:

" *The 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. WGSN maintains the IAU Catalog of Star Names. The focus during the 2021-2024 triennium will be:*

Ongoing Mission
- *to continue an exhaustive search of star names from the cultural astronomy literature,*

• *to adopt new IAU proper names for stars of scientific and historical value for community use following WGSN guidelines,*
• *to provide relevant expertise to support other IAU efforts related to celestial nomenclature, including public naming campaigns (e.g. NameExoWorlds).*

Anticipated Outputs
• *to maintain the IAU Catalog of Star Names‡ and assist the IAU with maintaining its web content on celestial nomenclature,*
• *to add etymological information to the IAU Catalog of Star Names in the interests of further preserving astronomical heritage,*
• *to construct a new supporting list or name bank of names for stars and associated asterisms which is culturally and geographically diverse,*
• *to refine WGSN guidelines for the proposal and adoption of names for stars.*

Following the past triennium, the naming purview for the WGSN will continue to be for stars, substellar objects, and stellar remnants, but specifically exclude exoplanets (purview of the new EC WG Exoplanetary System Nomenclature), interstellar medium features (nebulae), and extragalactic objects. Cultural names of asterisms have been added to the research purview of the WGSN in the interests of facilitating etymological investigations among Div C members (many traditions name a great number of asterisms and relatively few bright stars). In some cases, ancient asterism names may provide a potential source of new IAU names for individual stars. WGSN will also deliberate on the process by which "new" names for stars and substellar objects of scientific significance can be proposed by members of the international astronomical community.

The activities of the Division C WG Star Names are well-aligned with the IAU Strategic Plan 2020-2030¶ and the activities of IAU Division C, and the Working Group is considered Functional. The WGSN is specifically called out on p. 22 of 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."

2. Activities in This Past Triennium

2.1. *Organization*

Eric Mamajek stepped down as chair in November 2021 and Susanne Hoffmann was elected as new chair. Subsequently, the Group has reorganized itself in this context: The position of "Secretary" has been created for Eric, who continues to support WGSN in an advisory capacity as past chair. In order to focus the group's research activities and deliberations, two new task groups were formed: a philology group for compiling etymological information and an ethnology-anthropology group for compiling information on indigenous astronomy cultures. Doris Vickers took the lead for the etymology task group. The other group does not yet have a single lead, but has yet to work out the format for data collection. Several WGSN experts (Duane Hamacher, Clive Ruggles, Alejandro López, among others) have been leading discussions on this topic.

In 2023, in consultation with the WGSN membership, Javier Mejuto created a logo for the working group (see Fig. 1).

During the Triennium, WGSN approved additional names for the IAU Catalog of Star Names: *Geminga* for the pulsar PSR B0633+17 in Gemini, and *Rana* for δ Eri (HR 1136). The WGSN also recognizes the 20 new star names added via the NameExoWorlds 2022

‡ https://www.iau.org/public/themes/naming_stars/
¶ https://www.iau.org/static/administration/about/strategic_plan/strategicplan-2020-2030.pdf

campaign‖, bringing the total number of stars with IAU names to 471 as of early 2024.

Group members were sad to learn of the passing of Jay Pasachoff (1943-2022). His support was instrumental in the initial organizing of the WGSN, and he contributed to the group's deliberations since its founding. Obituaries celebrating Jay's life and contributions to astronomy appear online†.

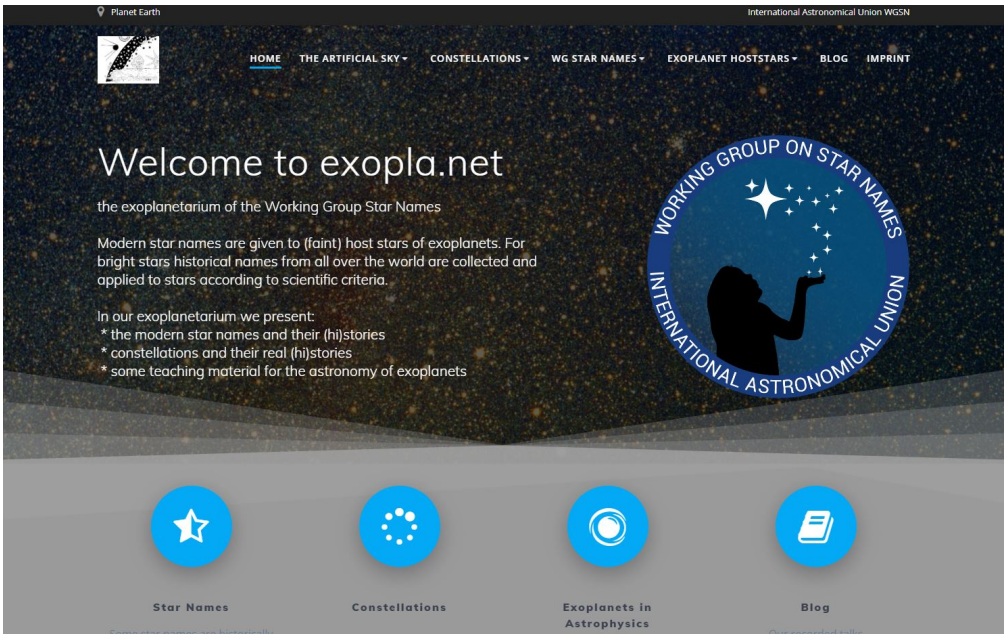

Figure 1. Screenshot of new WGSN website `http://exopla.net` with new logo.

2.2. *Research, Resources, Expertise*

Etymologies. As one of the first goals resulting from the statistical analysis of the past triennium, in 2021 Doris Vickers collated the etymological information she had used in a spreadsheet. In close collaboration with other members of the working group (e. g. Ruggles, Adams, Hamacher, Hoffmann), she successively added more information and presented her results in our annual meeting in January 2023. Since then, the spreadsheet is publicly displayed on the WGSN website. By the end of 2023, the etymologies were 59 % complete – the missing information easily findable in Kunitzsch & Smart (2006) will be revisited by Adams and Vickers in the future.

Global Name Bank. At the beginning of the triennium, there was interest among WGSN members in supporting the project "ancient-skies.org" that has had a website going back to at least the International Year of Astronomy (2009). We succeeded to negotiate a takeover of this project consisting of a joomla-frontend and mySQL-backend. Unfortunately, it turned out to be not useful for us because the database contained almost no data. However, we will develop something new on this ground.

‖ `https://nameexoworlds.iau.org/2022approved-names`
† `https://www.nytimes.com/2022/11/20/obituaries/jay-pasachoff-dead.html` and `https://president.williams.edu/in-memoriam/the-death-of-jay-m-pasachoff/`.

Several negotiations with other institutions (e. g., the IAU Database Manager, the Office for Astronomy for Education) did not return a solution for long-term data storage, although a student project at the University of Jena in summer term 2022 had developed a comprehensive research data management strategy. In 2023, the chair of the WGSN set up:

(*a*) a **new website** (see Fig. 1) under the URL `http://exopla.net` where we present
- background information (historical images and original/ ancient meaning) of the IAU constellations provided by Ian Ridpath and Susanne M Hoffmann,
- the etymologies for the names in the IAU Catalog of Star Names provided by the Etymology Task Group (lead: Doris Vickers).
- a blog on our activities (e. g. recorded talks by WGSN members).

(*b*) a shared cloud (Google) drive where information can be collected that the group needs for decisions, foremost several spreadsheets of name suggestions (with origin, etymology, references, and reason for the suggestion) and catalogs of unnamed bright stars,

(*c*) a mediawiki with more information on all sorts of names (for stars, constellations, asterisms. . .) has been drafted already and will be included in this website later.

Adding WG Expertise. Yunli Shi's recent PhD Boshun Yang joined the WGSN bringing expertise on historical Chinese constellations. Elly Dekker (historical European star charts), Chris Cannon (Northern Dene, Canada), Konrad Rybka (Locono culture, South America), Doina Bucur (global network analysis of historical constellation stick figures; Bucur 2022), and Marc Thuillard (global comparison of star lore) have kindly offered their expertise for consultation for future WGSN research and deliberations.

Compilation of Star Catalog for WG Naming Research. To assist the WGSN with efforts to compile published cultural star names for naked eye stars† (i.e. historical names of stars, indigenous/ historical constellations of diverse cultures, etc. Susanne Hoffmann in 2023 compiled a catalog of the naked eye stars (brighter than 6.5 mag) by IAU constellation. It consists of 8547 stars while only 471 stars are brighter than 3.9 mag. Among them, 22 main stars of the IAU constellations do not have IAU-recognized proper names. Hence, there are roughly 8000 naked eye-stars between 4 and 6.5 mag that can be officially named with names of extinct or indigenous constellation names: for instance, the obsolete constellation name of the Solitaire (an extinct Dodo-like bird) could easily be adopted for a star within its former area in order to remind people on the changing biological diversity on our planet. Whether or not to use this (and other) name(s) and for what star has to be discussed within the group.

Compilations of historical names of stars, asterisms/constellations and intangible astronomical heritage of various cultures have been collected by several WGSN members, predominantly Ian Ridpath, Juan Belmonte, Clive Ruggles, Steven Gullberg, Susanne Hoffmann, and Eric Mamajek. From these compilations, 248 names have been suggested for future discussions as of the end of 2023, and notably 283 Chinese names are being reviewed with regard to possible usability.

† WGSN originally considered "naked eye stars" to be those with Bright Star Catalog designations (HR #s) (Hoffleit & Warren 1991) (see 2015-2018 WGSN triennial report). While a magnitude limit of $V \leqslant 6.5$ mag is often quoted for BSC, it is neither complete (see BSC Supplement (Hoffleit, Saladyga & Wlasuk 1983)), and also contains hundreds of fainter stars in the magnitude range $6.5 < V < 8.0$ mag.

2.3. *Supporting IAU Activities and Website*

NameExoWorlds. After the success of the IAU100 NameExoWorlds public naming campaign in 2019, the IAU Executive Committee requested another campaign‡ in 2022, which was supported by the Office for Astronomy Outreach (OAO) and co-chaired by WGSN secretary Eric Mamajek. The call and the results were posted to the website `http://www.nameexoworlds.iau.org/`. Before and after the campaign, the draft naming guidelines and results were shared with WGSN for feedback on the naming process and final selections.

IAU OAE 2022 Astrophotography Contest. WGSN chair Susanne Hoffmann was a juror for the IAU OEA 2022 Astrophotography Contest which was dedicated to the topic of historical constellations. It is hoped that these contests may foster future collaboration(s) in preservation of intangible astronomical heritage and the use of this knowledge in education. Hoffmann was quoted in the IAU press release on the contest†.

Updating Online IAU Constellation Information. In 2022, the OAO reworked the IAU websites and requested WGSN support for updating content related to the IAU constellations‡ and star names¶. What was initially intended as a quick question to check some specific information led to an inspiring group activity in rewriting the website, revisiting the English translations of the official Latin names, and providing new illustrations displaying Chinese and Inca constellations as two famous alternatives to the IAU constellations. Leading in this activity were Susanne Hoffmann, Rob van Gent, Ian Ridpath, Steven Gullberg and Eric Mamajek, with valuable contribution by many others.

2.4. *Meetings*

Splinter **Meeting** "Astronomy in Culture" **2021**. In September 2021, a splinter meeting was held online at the occasion of the annual meeting of the German Astronomical Society. It was organized by Susanne M Hoffmann and Gudrun Wolfschmidt with the topic "Astronomy in Culture – Cultures of Astronomy", and contributions by many of the WGSN group members. The proceedings were released in late 2022 (Hoffmann & Wolfschmidt eds., 2022) with contribution by Vickers, Shylaja, Gullberg and others.

Scientific **Meeting** "The Artificial Sky Jena **2023**". In November 2023, WGSN held a joint conference with the development team for Stellarium (Zotti et al. 2020) in Jena (Europe). It was organised by Susanne M Hoffmann, Doris Vickers and Georg Zotti in order to explore possibilities of collaboration. Mamajek gave a talk reviewing the history of the WG Star Names. WGSN acknowledges the kind support of the Michael Stifel Center/ University of Jena, Planetarium Jena, State Museum for Prehistory Halle and the Stellarium Funds. The recorded talks from this meeting are available at this website‖.

2.5. *Public Activities*

WGSN members continued to answer inquiries from the public, astronomical community, and IAU leadership on celestial nomenclature and IAU history and policy on the topic.

Danielle Adams gave numerous talks (at 16 over the course of the triennium), seminars and public lectures on Arabic star names.

The recorded talk "The First Astronomers" by Duane Hamacher was used (at least) 19 times in 2023, all over the world for lectures and seminars, and in 2022 he gave 11 book

‡ `https://www.iau.org/news/pressreleases/detail/iau1912/`
† `https://www.iau.org/news/announcements/detail/ann22042/`
‡ `https://www.iau.org/public/themes/constellations/`
¶ `https://www.iau.org/public/themes/naming_stars/`
‖ `https://exopla.net/the-artifical-sky-jena-2023/`

presentations on this topic (Hamacher with Elders 2022). His recorded talk "Indigenous Astronomy" was used (at least) 5 times in 2023 in various contexts (lectures, interviews, conference talk).

Hoffmann gave several book presentations in planetariums etc. (Hoffmann 2021a). In collaboration with other scholars (e. g. M. Ossendrijver, D. Mendel-Leitz, D. Blume, K. Ellerbrock), she gave two public talks with the means of fulldome planetarium projections within the frameworks of scientific conference in Berlin and Jena 2022. One talk was dedicated to Egyptian and Babylonian star names, the other one to the astronomy in Dante Alighieri and his unintentional invention of the Southern Cross (Hoffmann & Blume 2023; Hoffmann & Wolfschmidt eds., 2022).

As an outreach activity during our scientific meeting in Jena 2023, Hoffmann, Zotti and Vickers gave a public talk in the world's oldest still working Zeiss-planetarium. All participants of the meeting were present and willing to answer questions.

3. Looking Ahead

The WGSN is specifically called out on p. 22 of 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.*"

Therefore, we repropose WGSN for the next triennium.

3.1. *Next Steps*

In December 2023/ January 2024, Susanne M Hoffmann has set up a mediawiki on a virtual machine (server) at the Friedrich Schiller University of Jena (Germany).‡ This instance is publicly visible but the right to edit and contribute information is only granted for the members of IAU WGSN.

In their ongoing research projects on Chinese and Greco-Babylonian constellation history, Boshun Yang and Susanne M Hoffmann, respectively, will share information publicly on this server. All other members of the WGSN are encouraged to contribute their findings on etymologies and cultural background of the proposed names for stars and constellations.

By containing information for all names, regardless of whether or not they are or will be members of the IAU-Catalog of Star Names, this online encyclopaedia will preserve the intangible heritage of all cultures that we can access. Furthermore, the detailed and profound information provided in this storage system with given author(s), references and edit-history (versioning) will serve for decision makers in our WG to include or exclude names from the IAU-Catalog of Star Names, and in case of acceptance, the according pages will later be linked to the etymology table.

However, the discussion of names has recently become too complex for only written exchange while in contrast the personal meetings at the edge of conferences have been extraordinarily productive. Hence, in order to foster decisions and to profoundly discuss the suggestions, the WGSN has agreed to introduce regular online-meetings starting in April or May 2024. While discussing star names, we will also have to discuss scientific

† `https://www.iau.org/administration/about/strategic_plan/`

‡ `https://xing.fmi.uni-jena.de/mediawiki/index.php` ... "xing" being the transliteration for "star" in Chinese.

terminologies in this highly interdisciplinary research field, and respectfulness with regard to different views in different cultures of origin.

3.2. *Open Questions*

Technically, WGSN now possesses the means to work: a storage system (mediawiki) for all background information, a (private) issue board on GitLab in order to structure the discussions and preserve arguments pro/contra name applications in the IAU-Catalog specifically, a YouTube-channel to store recorded talks, a website that we can edit and update ourselves at any time, and a (not public) Google Drive to store all documents. However, the technical background of this system is currently considered preliminary: a long-term solution for data storage and generally the research data management is still needed.

Content and Strategy. Some open questions of the past triennium will probably never have any always valid solution:

- Should we use eponymous names?
  - Some historical names are well established like Cor Caroli or Barnard's Star, and any change would cause confusion.
  - In many cases of public proposals, there are terrific alternatives; e. g. in case of authors of national cultural heritage one could choose the title of the work (the painting/ novel/ science book) instead of the name of the author.
  - However, eponymous names may require to study the biography of the person with all bad behaviour that humans may occasionally have. Who wants to judge whether a specific person is or is not "good enough" or "important enough" for the global society (with all their different political, social, ethical views)?
- Should we use old geographical names? – Occasionally, there are such suggestions but names with any significance (political, cultural, religious) that are glorified by any specific group of people may simultaneously offend another group. We should carefully check all proposals and decide individually.
- Should we correct errors in former names?
  - In earlier naming campaigns, errors have been corrected in consultation with the proposing National Committee.
  - Changing the spelling of an "approved" name could possibly cause confusion.
  - However, philology occasionally changes their minds: e. g. (a) the reconstruction of historical languages is ongoing research and the general opinion may change, (b) transliteration systems are sometimes changed as it was done for Chinese characters in the middle of the 20th century, and (c) transliteration depends on the target language, so it may happen that an Arabic star name was introduced in French or German transliteration in any historical source while we now need the English transliteration for the IAU-approval.
  - As research in history and on cultural heritage of all type goes on, the identification of heritage names may be changed. The group has agreed that this may in general only lead to an addition to the information on etymology and not to a change of a name. However, each and every case should be considered individually with regard to respect for the culture of origin.

Susanne M Hoffmann
Chair of the Working Group

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