

**STATISTICS FOR IAU-APPROVED PLANETARY NOMENCLATURE HELP CHART AN EFFECTIVE STRATEGY FOR DIVERSITY AND INCLUSIVITY.** T.A. Gaither<sup>1</sup>, S.R. Black<sup>1</sup>, S.R. Bogle<sup>1</sup>, and J.A. Skinner, Jr. <sup>1</sup>U.S. Geological Survey, Astrogeology Science Center, 2255 N. Gemini Dr., Flagstaff, AZ 86001 ([tgaithe@usgs.gov](mailto:tgaithe@usgs.gov)).

**Introduction:** Planetary nomenclature is a tool that provides unique identifiers to topographical, morphological, or albedo features on the surfaces of planets, satellites, and small bodies. The purpose of formal planetary nomenclature is to facilitate the scientific community's identification and discussion of surface features in papers, presentations, and maps.

The task of naming planetary surface features, rings, and natural satellites is managed by the International Astronomical Union's (IAU) Working Group for Planetary System Nomenclature (WGPSN). Since the early 1970s, volunteer members of the WGPSN and its six Task Groups have strived to provide a clear, unambiguous system of planetary nomenclature that represents cultures and countries from all regions of Earth. Since the 1980s, the USGS Astrogeology Science Center (ASC) has managed (for the IAU and with the financial support of NASA) the ever-growing database of planetary names, the online [Gazetteer of Planetary Nomenclature](#) [1], and the [IAU name proposal process](#), for the planetary science community. There are currently 15,941 IAU-approved names in use for surface features located on all planets, satellites, and small bodies.

**Name Approval Process:** The IAU WGPSN requires that proposed names adhere to specific rules and conventions, including but not limited to:

- Names should be simple, clear, and unambiguous.
- Names should only be approved for features that are scientifically significant and useful to the scientific and cartographic communities at large.
- Solar system nomenclature should be international in its choice of names.

Planetary features are named when members of the science community have a salient scientific need. Scientists preparing manuscripts for peer-reviewed journal articles or maps may request a planetary feature be named by following the [Name Request Instructions](#) on the Gazetteer website. Requestors submit a short scientific justification, a timeline for publication of the work in which the name will appear, annotated and unannotated images of the feature, geographic boundaries, and feature size. Though specific name suggestions are considered, final selection of the names is solely the responsibility of the IAU and must fit the designated theme for each feature type.

Name proposals are first reviewed by one of the six Task Groups (Mercury, Venus, Moon, Mars, Outer Solar System, and Small Bodies) and then reviewed by

the WGPSN. For simple name requests (i.e., one or two crater names), the process typically takes four to six weeks. More time may be necessary if the proposal is complicated, includes multiple feature names, and/or if significant questions are raised during the review process. Upon WGPSN approval, names are considered formally approved and may be used in publications. Approved names are immediately entered into the database and a feature page is created in the Gazetteer of Planetary Nomenclature.

**Diversity and Inclusivity in Planetary Nomenclature:** There is a known lack of gender and cultural diversity, as well as inclusion of indigenous participation, in planetary nomenclature [2-5]. The current imbalance is, in large part, the legacy of three centuries of telescopic mapping of the Moon by individual European astronomers, which resulted in several different systems of lunar nomenclature [6]. In 1935, after decades of effort, the IAU reconciled and standardized lunar nomenclature [7], which greatly benefited international scientific communication but cemented the legacy of exclusion of women, people of color, and other underrepresented groups from lunar nomenclature. As space exploration progressed rapidly in the mid-20th century with the Mariner program, names of white European male scientists, mathematicians, artists, and musicians continued to dominate planetary nomenclature [8,9].

We have used the planetary nomenclature database search available at [1] to assess baseline statistics for the gender and cultural/geographic diversity of the entire dataset (Tables 1 and 2). Our goal is to determine whether, as the participation of underrepresented groups in STEM has slowly increased over the past decades [10], IAU feature name approvals have reflected these demographic changes. To assess whether IAU nomenclature has become more diverse and inclusive, we compare gender and geographic diversity statistics for two different time periods: 1935-2013 and 2014-2023. In this assessment we used gender assignments given in the publicly available references in [1] and used the Ethnicity/cultural group or Country (ET) and Continent (CT) given in the database. The gender data include only real historical people (not gods, goddesses, or mythological figures) and do not include the 7000+ name duplications from satellite features (lunar lettered craters) or other instances of duplications. "Commemorative" names are defined as names of

historical people, and “BIPOC” is defined as Black, Indigenous, or People of Color.

Table 1 shows the percentages of approved feature names that commemorate historical people for the periods 1935-2013 and 2014-2023. The data show that the percentage of planetary features named for women increased from 21.0% in the 1935-2013 period to 41.9% in the 2014-2023 period. Percentages of BIPOC names for 1935-2013 will be provided in the LPSC presentation for similar comparison. In the last two years, over 50% of approved commemorative names were for women who made outstanding or fundamental contributions to their fields.

It is important to note that such commemorative names are a small percentage (~17%) of the total number of new names approved each year. Most IAU feature name themes draw from categories other than names of people, including terrestrial geographic features, ships, drums, etc. Therefore, the geographic distribution of names is a useful approximation of ethnic and cultural diversity. The data provided in Table 2 show geographic diversity has increased significantly during the 2014-2023 period, with a reduction in the proportion of names of European origin and an increase in the proportion of names from all other geographic origins.

**Summary:** The modern IAU WGPN’s Rule 8 emphasizes the importance of international representation and the “*equitable selection of names from ethnic groups, countries, and gender on each map.*” Our analysis shows that while we are certainly far from equity in representation, diversity in planetary nomenclature is steadily increasing. These data suggest that the existing nomenclature themes, rules, and conventions are sufficiently inclusive to allow the addition of increasing numbers of names from traditionally underrepresented groups to the IAU planetary nomenclature system. Such names should be actively compiled and continue to be proposed to the IAU by planetary scientists and mission teams. We recommend increased community engagement and collaboration with the IAU and indigenous communities to promote increased diversity and inclusion in planetary nomenclature.

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**References:** [1] Gazetteer of Planetary Nomenclature, USGS ASC and IAU, <https://planetarynames.wr.usgs.gov/> [2] Grier J.A. (2019) [The Crisis in Naming the Universe](#) [3] Lakdawalla E. (2008) [Where are all the women?](#) [4] Tiscareno M.S. et al. (2020) [Planetary Nomenclature and Indigenous Communities](#) [5] Lennox A. (2023) 54<sup>th</sup> LPSC #1629 [6] Whitaker E. A. (1999) Mapping and

Naming the Moon: A History of Lunar Cartography and Nomenclature. [7] Blagg M. A. and Müller K. (1935) Named Lunar Formations. [8] Blunck J. (1977) Mars and its Satellites: A Detailed Commentary on the Nomenclature. [9] Davies M. et al. (1978) Atlas of Mercury, NASA SP-423. [10] Diversity and STEM: Women, Minorities, and Persons with Disabilities [NCSES Report](#) (2022).

IAU Nomenclature Gender Diversity Statistics		
Group	1935-2013	2014-2023
Total # of Names Approved	14,941	1000
Commemorative Names Approved	2545	179
% of Commemorative Names	17.0%	17.9%
% of Commemorative Names (Women)	21.0%	41.9%
% of Commemorative Names (Men)	79.0%	58.1%
% of BIPOC Commemorative Names (Women)	TBD	6.2%
% of BIPOC Commemorative Names (Men)	TBD	15.6%

Table 1. IAU Nomenclature gender diversity statistics calculated from data available at [1].

Continent	% World Population (2023)	1935-2013 (% of 14,941)	2014-2023 (% of 1000)
Africa	17.60%	3.3%	8.9%
Antarctica	0.00%	0.013%	0.2%
Asia	59.40%	9.5%	25.9%
Europe	9.40%	74.4%	37.6%
North America	7.50%	9.6%	17.4%
Oceania	0.60%	1.5%	4.5%
South and Central America	5.50%	1.4%	5.5%

Table 2. IAU Nomenclature geographic diversity statistics calculated from data available at [1].