

Astro2020 APC White Paper

A Hua He Inoa: Hawaiian Culture-Based Celestial Naming

Thematic Area: State of the Profession Considerations

Principal Author and Contact Information: Ka'iu Kimura, 'Imiloa Astronomy Center, University of Hawai'i at Hilo, lesliek@hawaii.edu

Co-Authors:

Kanani Aton - Kamehameha Schools, kaaton@ksbe.edu

Kalepa Baybayan - 'Imiloa Astronomy Center, kalepa.baybayan@hawaii.edu

John DeFries - Native Sun Business Group & Native Hawaiian Hospitality Association, nativesunvision@gmail.com

T. Ilihia Gionson - Hiehie Communications & Native Hawaiian Hospitality Association, ilihia@hiehiecommunications.com

Heather Kaluna - Astronomy & Physics Department, University of Hawai'i at Hilo, kaluna@hawaii.edu

Keiki Kawai'ae'a - College of Hawaiian Language, University of Hawai'i-Hilo, keiki@hawaii.edu

Larry Kimura - College of Hawaiian Language, University of Hawai'i-Hilo, larrykim@hawaii.edu

Shane Palecat-Nelson - Kahu Ku Mauna Cultural Advisory Committee, shanen@oha.org

Doug Simons - Canada France Hawai'i Telescope, simons@cfht.hawaii.edu

Alan Tokunaga - retired Institute for Astronomy, University of Hawai'i-Mānoa, tokunagaa001@gmail.com

The views expressed represent the personal views of the authors, contributors, and endorsers, and not necessarily the views of their affiliated institutions.

Executive Summary:

The 'Imiloa Astronomy Center of Hawai'i, in partnership with Hawai'i-based astronomical observatories and the College of Hawaiian Language at the University of Hawai'i at Hilo offers the A Hua He Inoa (AHHI)¹ nomenclature project. This making ground-breaking project establishes Hawai'i as the first place in the world to weave traditional indigenous practices into the official naming of astronomical discoveries made in Hawai'i. It is a collaborative effort that shifts global paradigms by including Native Hawaiian speaking youth into the process of astronomical discovery naming. Youth that participate in this project engage with astronomers and Hawaiian language experts to learn about recent discoveries while also engaging in the creative process of naming these discoveries. Hawaiian youth are gaining a deeper understanding of and appreciation for Hawaiian and scientific knowledge as it relates to the origins of the universe and are also gaining an understanding of the unlimited potential for future fusions of culture and science.

Background:

Underrepresentation of Native Americans, Native Hawaiians, and Alaska Natives in STEM related fields is both significant and persistent. In 2009, this group comprised only 1% of the science and engineering workforce (NSF 2011). Young people in indigenous communities throughout the U.S. continue to struggle with the balancing act of growing up between indigenous and non-indigenous discourses of culture and scientific pursuit (Faircloth & Tippeconnic 2010; NEA & NIEA 2010).

Contrary to the purported disconnect between indigenous knowledge and western science, indigenous peoples, and in particular Native Hawaiian people, have always been progressive and explorative of their surrounding world. Before the advent of modern-day maps, magnetic compasses and satellites, the ancient Hawaiians had a deep connection to the cosmic origins of their universe, as did their use of celestial objects to help navigate their voyaging canoes across great ocean distances of the Pacific utilizing the fixed positions of the stars. With their careful study of the cosmos, these skilled and knowledgeable explorers became some of history's early astronomers.

Scientists and science educators are beginning to recognize the importance and place of indigenous knowledge and language in the understanding of the natural world, and in engaging Native students disconnected from the process and knowledge of science (Aikenhead & Michell 2010). Work by Willard Gilbert (2011) demonstrates that recognizing and integrating cultural and linguistic intellectual strengths of Native youth in an academically rigorous and culturally

¹ <https://imiloahawaii.org/news/a-hua-he-ino-8e3ax?rq=AHHI>

relevant and responsive manner improves academic achievement while simultaneously revitalizing and preserving traditional cultural knowledge and language.

In addition to a diverse pool of scientists and educators who can bring new perspectives to science and to the public understanding of science, the U.S. needs a well-informed, scientifically literate society that includes opportunities that account for and value indigenous voice. If we engage everyone in the intersection of Native and Western worldviews, the larger value is to open doors for the next generation of Native youth (Barnhardt & Kawagley 2010; Brayboy & Castagno 2008).

Today, indigenous voice is being resurrected through a unique and collaborative educational program led by the 'Imiloa Astronomy Center of Hawai'i at the University of Hawai'i at Hilo (UH Hilo). Known as A Hua He Inoa, or "calling forth a name", the program aims to create pathways in which Hawaiian language and culture is at the core of modern scientific practices. The program has drawn keen interests from astronomers, cultural practitioners, and educators worldwide.

The AHHI project was initiated in 2017. The project's genesis is credited to Hawai'i Island community leader John DeFries, who in a 2017 memo addressed to the Kahu Kū Mauna advisory council to the Office of Maunakea Management, requested that Hawaiian language names be used when naming local discoveries to the International Astronomical Union (IAU).

As chance would have it, the first known interstellar object was discovered by UH's Pan-STARRS observatory on Haleakalā, Maui, on October 19th of that year, and subsequently studied via the Canada-France-Hawai'i telescope on Maunakea, Hawai'i. Dr. Doug Simons, Director of the Canada-France-Hawai'i Telescope, saw this discovery as an opportunity to test DeFries' concept and made the connection between the discovery and the Hawaiian community. This discovery altered the trajectory of the AHHI program.

Renowned cultural practitioner Dr. Larry Kimura², also an associate professor at Ka Haka 'Ula o Ke'elikōlani College of Hawaiian Language at UH Hilo, suggested the name 'Oumuamua or "a messenger sent from the distant past." The name was immediately adopted by the astronomical community - including the IAU. Mainstream media and the general public also immediately took to the new name. This marked a radical departure from the standard practice of using alphanumeric labels to name objects. It also helped to propel the use of Hawaiian language in mainstream media coverage.

Most recently, Kimura was once again called upon to name the first image ever captured of the supermassive black hole in the M87 galaxy. He named it Pōwehi or "embellished dark source of unending creation." The Maunakea-based James Clerk Maxwell Telescope and the Submillimeter Array, part of the eight-telescope international collaboration, played a key role in

² Dr. Kimura is recognized as the "grandfather of the Hawaiian language renaissance" for his pioneering efforts in Hawaiian language revitalization.

the discovery announcement made in early April 2019. Pōwehi has not officially been adopted by the IAU, however it has been widely received by many in the international astronomy community, science enthusiasts, and the general public alike.

Realizing the tremendous global acceptance of these Hawaiian names, and the potential for major cross-cultural exchange of indigenous and scientific knowledge, a working group was formed to develop a process that would allow for on-going collaboration between Hawai'i-based observatories, the University of Hawai'i, and the Hawaiian speaking community. The program aims to normalize the use of Hawaiian names for major astronomical discoveries generated from Hawai'i on a consistent basis. The collaboration also focuses on engaging Hawaiian speaking youth as major contributors to the research and naming processes.

Additional to DeFries, Simons, and Kimura, the AHHI working group is comprised of other Hawaiian language experts, education leaders spanning K-12 and higher education, top astronomers from the state's observatories and community leaders involved in the management of the Maunakea science reserve.

An initial pilot program was offered in October 2018 which utilized the expertise of the working group members to teach and engage with high school and university students from the two islands that are home to astronomical observatories, Maui and Hawai'i Island. The group learned about the discovery of two unusual asteroids, visited the astronomy facilities at the summit of Maunakea and deepened their understanding of the vital relationship and role of tradition and culture in modern science.

The pilot culminated in the selection of Hawaiian names created by the students for two discoveries made earlier by Pan-STARRS. As a result, Kamo'oalewa and Ka'epaoka'āwela now serve as the official names for 2016 HO3, an asteroid that orbits the Sun like the Earth but in a slightly different orbit, and 2015 BZ509, an asteroid near the orbit of Jupiter that moves retrograde to Jupiter's orbit, respectively. Kamo'oalewa is sourced from the Kumulipo³, and alludes to a celestial object that is oscillating, reflecting the asteroid's path in the sky when viewed from Earth. Ka'epaoka'āwela means "the mischievous opposite-moving companion of Jupiter," evoking the image of a retrograde object of unknown origin. Students who participated in this pilot project reflected on their experiences below:

"Being able to be a part of, and experience, the connection between today's science and our ancestral knowledge in the A Hua He Inoa program showed me the importance of learning about our culture and applying these lessons to our future," said 'Ālika Kuamo'o-Wilhelm, 2019 graduate of Ke Kula o Nāwahīokalani'ōpu'u.

"Naming asteroids using 'Ōlelo Hawai'i and Hawaiian traditions, and having those names recognized by the IAU, demonstrates that Hawaiian language has a

³ Kumulipo - A traditional Hawaiian chant that accounts for the origins of the universe

significant place in modern science,” said Kelekolio Kuamo’o-Wilhelm, 2019 graduate of Ke Kula o Nāwahīokalani’ōpu’u.

Subsequent to the IAU’s acceptance of ‘Oumuamua, both names have been officially adopted by the IAU, which is a promising start to a future of indigenous celestial naming.

Recommendations:

With the successes that we've experienced thus far, we hope to replicate and scale this effort locally, and with other indigenous communities across the nation. Indigenous traditions, as applied to astronomical research and education, are an opportunity for indigenous youth to deepen their cultural foundations while expanding their scientific understanding of the universe, ultimately helping to diversify the field of astronomy. In order to do so, support is needed in the following areas -

- Support for the ‘Imiloa Astronomy Center and its collaboration with the College of Hawaiian Language and Hawai’i-based observatories through grants that would solidify the infrastructure necessary to ensure an on-going process that engages youth, Hawaiian culture and Hawai’i astronomy. This infrastructure would include outreach to other indigenous and astronomy communities throughout the U.S.
- Through conferences, workshops, publications, and professional development further enroll the astronomy community in the importance of advancing indigenous cultures together with astronomy.

Conclusions:

The students who participated in the inaugural AHHI program stretched their learning and imaginations, gaining an appreciation for the Hawaiian culture in relation to the universe and an understanding of the unlimited potential for future fusions of culture and science. These students helped make history, and learned that their voices are not only important, but necessary.

Additionally, AHHI creates pathways in which language and culture are at the core of modern scientific practice. Indigenous communities can utilize future-focused platforms like these to develop new contexts for indigenous knowledge and language to be applied to and “live” in to ultimately ensure the health and vitality of indigenous communities and their identities. Efforts like AHHI ultimately help to broaden the field of astronomy while also bringing indigenous language and knowledge to the forefront by establishing deeper cultural meaning to the scientific progress made in recent years and in years to come.

References:

Aikenhead, G. and H. Michell. 2010. Bridging Cultures: Indigenous and Scientific Ways of Knowing Nature. Pearson Canada.

Barnhardt, R. and O. Kawagley. 2010. Alaska Native Education: Views from Within. Alaska Native Knowledge Network.

Brayboy, B. and A. E. Castagno. 2008. How Might Native Science Inform "Informal Science Learning?"

Diversity in the Federal Science and Engineering Workforce.
<http://www.nsf.gov/statistics/infbrief/nsf11303>

Faircloth, S. C. and J. W. Tippeconnic III. 2010. The Dropout/Graduation Crisis Among American Indians and Alaska Native Students: Failure to Respond Places the Future of Native Peoples at Risk.
<http://www.civilrightsproject.ucla.edu/research/dropouts/faircloth-tippeconnic-Nativeamericandropouts-2010.pdf>

Gilbert, W. 2011. Developing Culturally Based Science Curriculum for Native American Classrooms. In: Reyhner, J. W. S. Gilbert and L. Lockard (Eds.), Honoring Our Heritage: Culturally Appropriate Approaches for Teaching Indigenous Students (pp. 43-55). Flagstaff, AZ: Northern Arizona University.

Learning Science in Informal Environments: People, Places and Pursuits. Washington, DC: National Academies Press. National Science Foundation (NSF). 2011.

National Education Association (NEA) and National Indian Education Association (NIEA). 2010.

National Research Council (NRC). 2009.

Native Education101: Basic Facts About American Indian, Alaska Native, and Native Hawaiian Education. <http://www.niea.org/data/files/policy/nativeeducation101.pdf>