

MAIANSE CONNECTing Indigenous Culture and Science Through Co-design of STEM (MAIANSE CONNECT)

Title: Curriculum: Ka mālamalama o ka mahina: Building pathways for indigenous lunar science in Hawai‘i

Institution: University of Hawaii, Honolulu

City/State: Honolulu, HI

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Summary: Embedded in the name “Ka Mālamalama o ka Mahina” means “Moonlight” with the word “mālamalama” also representing the light of knowledge. The proposed project, titled Ka mālamalama o ka mahina: Building pathways for indigenous lunar science in Hawai‘i, is motivated by a mission to improve participation and representation of Indigenous Hawaiians and Pacific Islanders in planetary science, and by a science goal to understand the development of the lunar surface regolith. This project represents the foundation of a new collaboration between planetary scientists at University of Hawai‘i at Mānoa in the Department of Earth and Planetary Science, and HONUA Scholars, an organization founded: (1) To combat the sharp decline in college and graduate school enrollment, particularly among Native Hawaiians as a result of educational complications due to COVID-19; (2) To empower Native Hawaiians to become leaders in science, technology, engineering, and math (STEM) while foreign and non-local interests continue to dominate Hawaii’s technology sector. HONUA Scholars aims to promote cultural, value-based STEM practices and to increase STEM participation from indigenous communities. An important aspect of the program is the creation of a network of future leaders who aim to empower others and to promote personal and professional development in STEM. Through this collaboration, undergraduate and high school students will be connected with and supported by our project scientists at University of Hawai‘i at Mānoa to pursue a cutting-edge project and contribute to lunar science. The project includes analysis of data from a number of NASA missions including Lunar Reconnaissance Orbiter Camper and Diviner Lunar Thermal Radiometer. The project will also foster the development of a number of widely applicable STEM skills including use of GIS software and data analysis Techniques. The science project will be pursued through for tasks and focus on understanding the present state of the regolith in regions around lunar skylights. Skylights are locations where a lava tube is thought to have collapsed and which reveal the layering of lava flows below the regolith. We will use crater counts, rock abundance data, and block counts to assess the state of regolith around four skylights and place our analysis in the context of the body of lunar scientific studies, including the Apollo mission which sensed regolith depth. Because this work focuses on the evolution of basalts on the Moon and is oriented around skylight, a geologic feature also presents on the Hawaiian Islands, the scientific project represents a link between Hawaii and planetary science. The undergraduate mentee and high school interns supported by this project will have the opportunity to attend and present their scientific findings at the Lunar and Planetary Science Conference, a yearly conference that brings together international specialists in petrology, geochemistry, geophysics, geology, and astronomy. This will allow mentees to meet and talk face-to-face with industry professionals and allow them to expand their career network. The mentees will also be able to present and share their knowledge with peers at the School of Ocean Science and Technology Open House alongside NASA scientists and researchers at the Hawaii

Institute of Geophysics and Planetology. The proposed project will accomplish a number of NASA's goals, including science directorate goals. The development and mentorship mission of the proposed work is relevant to the MAIANSE CONNECT call, and the science project is relevant to critical lunar surface science questions in the age of Artemis.