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Aloha mai kakou. (Hello everyone).

‘O Sarah ‘Alohilani Jenkins ko‘u inoa. (My name is Sarah ‘Alohilani Jenkins). ‘O Lily Nalulani Jenkins ko‘u inoa. (My name is Lily Nalulani Jenkins) Noho ‘olua ma mokupuni o Molokai ma Hawai‘i. (We live on the island of Molokai, Hawai‘i). Piha hau‘oli ‘olua i keia kakahiaka. (We are very excited to be here this morning).

Hello, my name is Lily and this is my sister Sarah. We are both excited and honored to be here this morning speaking on behalf of expanding STEM and entrepreneurship opportunities. When asked to testify at today’s hearings, two ‘olelo no‘eau or Hawaiian proverbs came to mind that we believe exemplify our personal growth, experiences, and successes in STEM education.

Li‘ili‘i ka ‘öhiki, loloa ka lua - Small is the crab, large is its hole. Size does not limit impact and achievement. This proverb illustrates the boundless achievements women and minorities have and will continue to have in science, technology, engineering, and mathematic career pathways, as well as the potential impacts we can have on our island’s, our state’s and our nation’s economic resources, political policies, and cultural values.

‘A‘ohe pau ka ‘ike i ka hālau ho‘okahi - not all knowledge is learned in one school. It is through the creation of strong STEM pipelines that serve as conduits between government agencies, industry professionals, post-secondary educational institutions, local scientists and engineers, and indigenous experts that all play a vital role in recruiting, retaining, and advancing women, minorities, and underrepresented students (like Lily and I) into the STEM workforce. We have and will continue to learn from these many sources.

As we mentioned in our greeting, our diverse upbringing began on the island of Molokai where in primary school, our field trips weren’t to museums, but to physical ecosystems such as working fishponds, freshwater streams, diminishing wetlands, and rainforest watersheds. These place-based experiences sparked our love for science and our passion to preserve our natural resources. Being both Hispanic and identifying with our Hawaiian heritage, we have become empowered through a scaffolding of awareness, exposure, engagement, and implementation programs and experiences. It is the collective mentoring of stakeholders in the STEM pipeline that has built our knowledge, our skillset, and our confidence to reach personal goals of achievement and research, to pursue post-secondary STEM education and careers, and to have a positive impact in our community both now and in the future.

So how did we get to our current mindset and ability? Maui Economic Development Board and their Women in Technology Program (or MEDB-WIT) hooks and inspires young minds at a very early age in their development by focusing on awareness and exposure to STEM concepts and STEM careers in elementary school. For example, in third grade (Lily) and fifth grade (Sarah), we created the first ever robotics teams on the island of Molokai with the funding and support of MEDB-WIT. We started off as a co-ed team, however, even at an early age we saw our

peers take a back seat role to the boys on the team.

Our coach observed this as well and divided us into two smaller teams, one of which was made solely of girls of various minorities. Having the opportunity to participate on an all-girls team gave us an avenue to have a voice and to take a leadership role where the boys on the team did not overshadow us. Additionally, we were able to work with industry professionals to solve a real-world problem and subsequently qualify for the state competition where we were recognized for outstanding gracious professionalism, teamwork, and innovative problem-based STEM research in our first year alone. We were empowered! Later on, every one of our team members became leaders even on co-ed teams, as well as leaders in school clubs, student councils, volunteer work and extracurricular activities. Every girl on that first robotics team is attending college and pursuing a STEM educational degree. It's the leadership, communication, and workforce readiness skills that helped us overcome our shyness, giving us the confidence to be successful in school and the desire to take informed civic actions in our Molokai community.

Inspired by the research from our first year in robotics, we became aware and driven by the issue of climate change. So, we partnered all five of our public schools with MEDB and local organizations to create the Go Green & Carbon Clean team CFL Project to provide compact fluorescent light bulbs at NO COST to Molokai residents. After three months and over 36,000 light bulbs replaced, Molokai is now 98% CFL efficient! More importantly, household savings of \$10-\$30 per month off of electric bills poses a collective island-wide savings of 7 million dollars within the 10 year life of the CFL bulbs – money that supports our local economy.

This initiative led to other projects in secondary school such as the Hui Up Energy Saving Appliance Exchange Program, home energy audits, teaching energy curriculum in schools, and the first ever energy audit on a public high school in the State of Hawaii, at Molokai High School.

In middle school, MEDB-WIT kept Lily and I, as well as our peers empowered by on-going exposure through a deeper, more advanced STEM exploration; providing curriculum and support for project-based learning. WIT's STEMworks program provided an education-to-workforce pipeline allowing for multi-faceted, hands-on learning where we were exposed to the most current, high-end technologies (such as computer assisted design software, geospatial software, 3-D modeling, coding, and probe-ware to mention just a few). The STEMworks program also helped to partner us with local industry professionals and educational institutions in community service learning projects to provide deliverable and maintainable solutions for our community and for the future.

In high school, we were able to demonstrate our practical experiences and implement our STEMworks knowledge and skillsets into the success of our own personal research. As student scientists, Lily and I were able to use this framework of problem solving in STEM, to seek out local scientists and engineers, industry professionals, university professors, and indigenous experts to provide their expertise towards our independent environmental place-based research.

Using GIS technology software that Esri and MEDB provided to our school, we analyzed the socioeconomic and ecological impact of the Red Mangrove and sea level rise on Molokai. Additionally, we partnered with agencies and community mentors, which included the U.S. Army Corps of Engineers, NOAA, U.S. Geological Survey, and California Department of Transportation in order to model and determine mangrove's imminent threats to our fringing reef.

Coral reefs are essential for the livelihood of Molokai residents through tourism, fisheries, subsistence, cultural practices, recreation, and other values. Furthermore, reefs dissipate wave energy and thereby protect coastal infrastructure such as fishponds, beaches, and shoreline property values. Because of their unique biodiversity coral reefs are of great interest to scientists, students, communities, policy makers, and Lily and I. In addition, coral reefs play an important spiritual and cultural role. Our survey results indicate that sea level rise and Red Mangrove's expansion will result in the loss of social and Hawaiian cultural connections to specific locations. These and many other functions grant the coral reef a crucial socioeconomic value on Molokai.

Moreover, our GIS modeling proves that Red Mangrove has reached approximately two-thirds of the distance to Molokai's fringing reef, the longest fringing reef in the United States, since its introduction in 1902. It is currently continuing its march and within the next 75 years, GIS mapping indicates that Red Mangrove will most likely establish itself upon the fringing reef, regardless of the projection of sea level rise, due to its ability to survive at depths exceeding present conditions and its rapid progradation rate. If Red Mangrove is not managed or eradicated, it will result in economic loss exceeding \$150 million annually as determined by surveys of residents, property owners, and visitors. Maximum sea level rise on Molokai will also inundate approximately 17,000 hectare of land along the south shore with a property value economic loss of over \$30 million. Although, it is important to note that Lily and I believe our reefs are priceless. Our analysis of the total economic value of Molokai's fringing reef justifies the necessity of a Management Plan for partial or widespread management or complete eradication.

Currently, Lily and I are working to continue our research, and lead the development of a mangrove and Gorilla Ogo (an invasive seaweed) management plan for the island of Molokai. This summer, we are dipping our toes in the workforce as ocean conservation research fellows with an environmental policy firm, Civic Enterprises based out of Washington, D.C. to combine personal and community led efforts to create an ocean conservation team on Molokai for the possibility of designating a federally and state supported marine protected area incorporating community based management.

Our growing confidence as girls pursuing STEM gave us the ability to take a technical principle, like the engineering design process or a technology like GIS or the communication skills to advocate in political venues, and turn it into something that could impact our island and our state. Remarkably, these are only a FEW examples of the opportunities and experiences that MEDB-WIT has exposed Lily and I to within the past 11 years of our lives. We may be only two girls (a small number in the global population), but any single person or group can be a catalyst of great change and inspire change in others. Empowered by MEDB's STEM pipeline, Lily and I are called to action in an effort to pursue environmentally and culturally conscientious projects that help drive our local and state economy, and our future policies for the betterment of Hawai'i. We are exemplars of the impact an exceptional STEM pipeline can have, and one that should be replicated in primary and secondary education systems across the U.S. Creating a STEM pipeline for primary and secondary education systems in the U.S. can be a catalyst of the even greater change we as a nation wish to see in the world. A strong STEM pipeline will fuel sparks like ours into a fire for other students to also pursue STEM educational and career pathways.

Mahalo.