

Ko'u Mo'olelo: My Journey as a Kanaka Maoli Rediscovering Balance in Engineering Education (Experience)

Austin Peters

Austin Morgan Kainoa Peters is a current B.S./B.A. Integrated Engineering student at the University of San Diego's Shiley-Marcos School of Engineering graduating Spring '22. Peters was born and raised in Wailuku, Maui, Hawai'i, and plans to attend Purdue University's PhD program in Engineering Education beginning Fall '23.

Ko'u Mo'olelo: My Journey as a Kanaka Maoli Rediscovering Balance in Engineering Education (Experience)

I Ka Wā Ma Mua (Past Experiences and History)

He Angus Kealoha Peters ke kane, He Barbara Ann Burley ka wahine

Angus Kealoha Peters the man, Barbara Ann Burley the woman

Hānau 'ia 'o Angus Kealoha Peters Jr. ke kane

Gave birth to Angus Kealoha Peters Jr. the man

He Morgan Bedald Peris Jr. ke kane, He Valerie Ku'ulei Garcia ka wahine

Morgan Bedald Peris Jr. the man, Valerie Ku'ulei Garcia the woman

Hānau 'ia 'o Karla Helene Kealaonāpua Peris ka wahine

Gave birth to Karla Helene Kealaonāpua Peris the woman

He Angus Kealoha Peters Jr. ke kane, He Karla Helene Kealaonāpua Peris ka wahine

Angus Kealoha Peters Jr. the man, Karla Helene Kealaonāpua Peris the woman

Hānau au 'o Austin Morgan Kainoa Peters

Gave birth to me, Austin Morgan Kainoa Peters

My mo'okūauhau (genealogy) is the beginning of my mo'olelo (story) in the relationship between my racial and academic/engineering identity. In the Kanaka 'Ōiwi (Native Hawaiian) perspective, my mo'okūauhau does more than just track my ancestors. It ties me to the land they are from, the experiences they had, and the lessons they learned [1]. For example, my multicultural heritage is represented through the Portuguese, Hawaiian, Russian, Filipino, and French ethnicities on my mother's side and the Portuguese, Hawaiian, Korean, and Dutch ethnicities on my father's side. In the context of Maui and my Hawaiian identity, I may have been born and raised in Wai'ehu, Maui, Hawai'i, but my mother's family land is in Pā'ia while my father's side is in Mākena. These ethnicities and locations show how globalization and colonization of the Hawaiian Islands play an integral role in my multiracial identity and the loss of family land, respectively.

The mo'olelo of engineering in Hawai'i also begins with a mo'okūauhau. The Kumulipo is the 'Ōiwi genealogy of all people by forming the identity and mindset of Native Hawaiian culture. This 2,108-line oli (chant) extends over 800 generations beginning in the time of darkness or Pō and describes the evolution of the universe [1]. The Kumulipo begins with light, heavens, and the earth continues with the creation of plants and animals and finally the gods that created humans [1]. This evolutionary aspect creates an indigenous understanding of the land or 'āina in terms of its relation to people [2]. Our 'āina can be seen as a beloved ancestor that provides for us, and we as stewards of the 'āina must treat it with the same, if not more love and respect than other ancestors [3]. Unlike the dominant Western perspective of humans using the land and its resources solely for the well-being of the community, an 'āina-based perspective comes with observing and developing an understanding of the land that can sustain all forms of life and other natural abiotic elements equally [3].

This 'āina based-perspective can be seen in the prehistoric hydraulic and agricultural engineering of Hawai'i that was able to provide for the people, as well as care for the land [4]. Using their knowledge of the land from observation, the Native Hawaiians before Western contact developed

land divisions called ahupua‘a that followed watersheds from the mountains to the oceans [5]. Native forests in the mountain were left intact by knowledgeable and careful silviculture to utilize the wood and animals needed for society, but keeping the ecosystem intact [6]. Much of the agriculture and engineering occurred in the wetlands where the use of irrigation was widely spread for lo‘i (agricultural fields), mainly kalo (taro) and ‘uala (sweet potato) [7]. These pondfields required vast amounts of infrastructure from stream diversions, irrigation ditches, and terracing or other techniques in the field [6]. Some lo‘i also incorporated raising small freshwater fish as another source of sustenance [7]. In the end, all the water went back to the stream for further use near the shore, soil fertility was maintained, and minerals were conserved [6].

Another engineering feat was built near the shore where loko i‘a (fishponds) were built to mimic the natural marine ecosystem [8]. These coastal fishponds were both in brackish water from previously used lo‘i kalo streams or in low-lying shores [8]. Kuapā (Rock walls) and mākāhā (sluice gates) helped to catch and raise fish in these ponds [9]. With the brackish water in these ponds, algae would proliferate creating food for the fish [9]. The kuapā and mākāha were engineered to withstand tsunami and hurricane conditions [9]. Both the loko i‘a and lo‘i came with years of knowledge to understand the interactions between the crops and the surrounding environment. Similarly, it took a deep understanding of resource management that can be seen in the kapu (laws) that forbade overfishing and irrigating too much water [7], [9]. Having this holistic, interdisciplinary approach to engineering with the ‘āina at the forefront allowed Native Hawaiians to sustain populations estimated at 800,000 or more people on these islands [7], [10].

The pre-Western history of Hawai‘i is where their engineering identity was at its peak. The relationship between my academic and cultural identity was at a similar stage in high school. I attended Kamehameha Schools Maui, a wealthy, private, Christain school that gives preference for children with Hawaiian ancestry, from Kindergarten to my senior year. I excelled in Western academia, especially in Math and Science. These were always my best subjects suggesting engineering as a viable possibility for my future. Simultaneously, I was able to learn about my Hawaiian culture within the context of a Western-based curriculum. At the school level, there were and still are influences of assimilation, but as a naive high schooler, I did not recognize them. I always saw my Hawaiian heritage and academic talents as two parts of my identity that would always work together to enhance all of my work.

Going to college completely severed these two portions of my identity. I decided to attend the University of San Diego, a wealthy, private, Catholic institution which I thought would be somewhat similar to my high school. However, leaving the islands and going to a predominantly White institution in California had a culture shock that separated my racial and academic identities. The courses, especially those in engineering, were almost entirely filled with white students that had more engineering experience in their pasts through camps and programs. I always felt out of place being picked last for group projects, sometimes used as the token minority by some professors, and feeling that my cultural identity was useless in the engineering discipline. Along with these feelings of incompetency, I struggled in the classroom cultures. For example, I have been taught to listen and only speak up when spoken to out of respect for my elders. This translated to the classroom as I would never say a word when I knew the answer or would not ask questions when I needed help. This led to the problem of feeling inept to peers and teachers leading to a larger fear of looking inadequate.

To combat this, trying to blend in, falling to assimilation, and relying solely on my academic identity became my answer. There was a lot on my shoulders from friends and family back home that expected me to succeed, and I was not going to let them down. If I fell due to a little adversity, it would become acceptable for my younger cousins, niece, and nephews to do the same. The last thing I want is them to stop going after their dream, so I let my mind become colonized. Code switching was a common practice for me between my friends from Hawai‘i and friends at school. The smallest actions of talking on the phone with my family versus studying with peers made me two different people, my cultural self and my academic self. When forgetting to code switch, I felt instant ridicule if the cultural person was in the engineering space or vice versa. I am sure this takes on many different forms for minoritized students everywhere.

Looking back to the history of Hawai‘i, Western contact also becomes the downfall of engineering prowess [11]. Slowly, the ‘āina-based mindset is taken over by domination and economic prosperity related to Western culture. Once “discovered” by Captain Cook, Hawai‘i began its colonization process [7], [12]. Through this time of Western development, the Hawaiian population was decimated, land was taken, and the language, culture, and customs nearly went extinct including the engineering talents and ‘āina-based perspectives [11], [12]. In terms of engineering, lo‘i and loko i‘a were nearly lost with the rise in sugar plantations and five huge businesses owned by foreigners: Castle & Cooke, Alexander & Baldwin, C. Brewer & Co., American Factors, and Theo H. Davies & Co [11], [12]. Sugar became the cash crop of Hawai‘i and the previous irrigation techniques were changed to meet the need for this export. These owners of the companies are descendants of the Protestant missionaries that began the colonization of the Hawaiian Islands [12]. As the need for economic and political control grew, members of these companies locked Queen Lili‘uokalani in ‘Iolani Palace after conspiring with President McKinley to overthrow the Hawaiian Monarchy [12]. These events led to the forced annexation and later on statehood of Hawai‘i on August 21, 1959, making the state an illegally occupied nation to this day [12]. During this period of colonization is where my mixed ancestry began and my family land was taken away. There were no deeds on family lands as Hawaiians did not believe in land ownership. As foreigners began to take control over land, Native Hawaiians became poor and were forced to work in the plantation fields to make a living [11]. Simultaneously, immigrants were brought in from across the world to meet the need for sugar exportation leading to the melting pot of Hawai‘i leaving many current Native Hawaiians with multiracial backgrounds.

Kēia Wā (Current Cultural Differences)

The colonization of the Hawaiian Islands also plays a role in distancing engineering for Kanaka ‘Ōiwi (Source). Western engineering is tied to development and goes back to this traumatic experience of nearly losing everything . Similarly, Western academia continues to discredit the engineering feats of Native Hawaiians by consistently underestimating the number of loko i‘a, lo‘i, and people it fed before contact [7], [10]. Although Native Hawaiian culture has been able to survive colonization and continues to rebuild itself, the cultural tensions and disconnect remains. These disconnects have certainly been part of my experience as a Native Hawaiian engineering undergraduate and is something I hope to bring to light through research.

Despite these disconnects, I recently have been able to reconnect my Hawaiian identity with my engineering identity in my last two years as an undergraduate. The Integrated Engineering Department and liberal arts education at the University of San Diego helped me to bring these ideas back together. Through learning about critical race theory and ecofeminism in core curriculum courses, feeling valued in the courses within my department, and doing engineering education research, I realized that my cultural heritage is of worth in academia, especially in engineering. When I reflect on these events that helped me to rediscover how my cultural and engineering identities can elevate each other, it goes back to my genealogy. I wanted to become an engineer to tie the perspectives of my ancestors into my work for the betterment of the planet and all things that inhabit it. This ‘āina-based perspective lives through me and the places that my ancestors have thrived. Bringing their story back is where my cultural identity fits into the engineering space and will continue. This concept goes back to the ‘Ōlelo No‘eau (Hawaiian Proverb) “I Ka Wā Ma Mua, I Ka Wā Ma Hope” that translates to “the future is secured in the past [13]. I must look back to my ancestors for guidance on their relationship to nature to shape my view on engineering in current times. The past is my lens to shape my future career and help to further the decolonization process in engineering education.

I Ka Wā Ma Mua (Research and Impact on the Future)

In terms of the larger Native Hawaiian community’s relationship with engineering, the same process of looking back to the genealogy of Hawai‘i or the Kumulipo should be followed. The Kumulipo describes dualisms that may seem to be opposites but are pairs that are fundamentally similar and complement each other [1]. These dualisms occur at all levels of the evolutionary process such as day and night, land and ocean, male and female, and seaweed and grasses [1]. Both parts of the duality are important and need the other to function [1]. I argue that Engineering culture and Native Hawaiian culture or development and tradition take on a similar dualistic relationship as ancient Hawaiians accomplished engineering feats, but through a different perspective. The dualities of the Kumulipo have achieved a balance described as pono in Hawaiian culture. Native Hawaiian artist Kaumakaiwa Kanaka‘ole gave her interpretation of pono as ‘not being righteous, but being the most authentic...neither right nor wrong, both are acknowledged and both are valuable [3].’

In both my mo‘olelo and the mo‘olelo of Hawai‘i, engineering identity fell with colonization and assimilation to the dominant Western culture. To rediscover pono, is to go back to the source of our ancestors and rediscover what engineering was in the context of Hawaiian culture. Engineering was a holistic and interdisciplinary understanding with the ‘āina guiding every decision. Pono as being authentic and true to both oneself and one’s past goes beyond Native Hawaiians relationship with engineering, but all people. Going back to the source and being the most authentic or pono version can diversify the engineering space as a whole. Marginalized individuals can rediscover their engineering pasts and bring their histories, perspectives, and counter narratives into the field centering their stories to decolonize the space. With this authenticity, diversity becomes an exchange of knowledge liberating students that may be assimilating to the dominant Western engineering culture.

Acknowledgements

I am grateful for the financial support of the University of San Diego's Lawrence Hinman Honors Research Grant and the USA National Science Foundation (NSF) Grant 1836504 for giving me the opportunity to travel present my research at the ASEE 2022 Annual Conference.

This paper is dedicated to my late grandfather, Angus Kealoha Peters, who is the first person listed in my mo‘okūauhau. He passed on January 30th, 2022 right around when this paper was getting its final touches. I know that Papa Angus was there helping me before submitting to ensure that we represented all of our ancestors and family to the best of our ability. His love and compassion for all people is a legacy that I will attempt to carry through my future research. Thank you Papa for every laugh, cry, and song. You will always be missed, but your impact will never be forgotten.

References

- [1] B. N. McDougall, “Mo‘okū‘auhau versus colonial entitlement in English translations of the Kumulipo,” *American Quarterly*, vol. 67, no. 3, pp. 749–779, Sep. 2015.
- [2] M. A. Meyer, “Our own liberation: Reflections on Hawaiian epistemology,” *Amerasia Journal*, vol. 29, no. 2, pp. 139–164, 2003.
- [3] Nākoʻa Oliveira Katrina-Ann R Kapā‘anaokalāokeola and E. K. Wright, *Kanaka ‘Ōiwi Methodologies: Mo‘olelo and Metaphor*. Honolulu, HI: University of Hawai‘i Press, 2016.
- [4] P. Pascua, H. McMillen, T. Ticktin, M. Vaughan, and K. B. Winter, “Beyond Services: A process and framework to incorporate cultural, genealogical, place-based, and indigenous relationships in ecosystem service assessments,” *Ecosystem Services*, vol. 26, pp. 465–475, Aug. 2017.
- [5] L. Gonschor and K. Beamer, “Toward an Inventory of Ahupua‘a in the Hawaiian Kingdom: A survey of Nineteenth and early Twentieth-Century Cartographic and Archival Records of the Island of Hawai‘i,” *Hawaiian Journal of History*, vol. 48, 2014.
- [6] J. G. Müller, Y. Ogneva-Himmelberger, S. Lloyd, and J. Michael Reed, “Predicting prehistoric taro (*Colocasia esculenta* var. *antiquorum*) Lo‘i Distribution in Hawaii,” *Economic Botany*, vol. 64, no. 1, pp. 22–33, 2010.
- [7] P. V. Kirch, *On the Road of the Winds: An Archaeological History of the Pacific Islands Before European Contact*. Oakland, CA: University of California Press, 2017.
- [8] S. R. Burckhard and J. Kant, *The PEEC experiment: Native Hawaiian and Native American Engineering Education*. Brookings, SD: Jerome J. Lohr College of Engineering, South Dakota State University, 2016.
- [9] W. K. Kikuchi, “Prehistoric Hawaiian Fishponds,” *Science*, vol. 193, no. 4250, pp. 295–299, Jul. 1976.
- [10] D. Swanson, “A New Estimate of the Hawaiian Population for 1778, the Year of First European Contact,” *SSRN Electronic Journal*, 2019.
- [11] R. H. Cordy, “The Effects of European Contact on Hawaiian Agricultural Systems - 1778-1819,” *Ethnohistory*, vol. 19, no. 4, p. 393, 1972.
- [12] P. Laenui, “The rediscovery of Hawaiian sovereignty,” *American Indian Culture and Research Journal*, vol. 17, no. 1, pp. 79–102, 1993.

- [13] M. K. Pukui and D. Varez, *'Olelo No'eau: Hawaiian Proverbs & Poetical Sayings*. Honolulu, HI: Bishop Museum Press, 2018.