

Commentary

Olin Lagon: Who Are Native Hawaiians Most Related To? You May Be Surprised

A new study finds the same wā settled both Hawaiʻi and Easter Island, carrying genes that leave some at risk of rare diseases.

By [Olin Lagon](#)
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57



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It's not a strong memory, but years ago I heard Nainoa Thompson tell a story about Hōkūleā's arrival at Rapa Nui (Easter Island) in 2017. As I remember it, the Rapa Nui welcomed the crew with an 'oli. Nainoa listened and knew exactly where on Maui they were describing, down to the mauna. No wā'a had passed between our islands in centuries. But a chant might have remembered shared places.



The team's paper made the cover of the Oct. 8, 2026, issue of Science. (Image: Science/AAAS. Illustration: Oliver Uberti)

A mind-blowing study in Science, **published today**, brought that fuzzy detail roaring back.

Of every Polynesian island the team studied, the people most closely related to kanaka 'ōiwi are the Rapa Nui. The authors say the simplest explanation is that the same crews settled both. Rapa Nui is part of Chile, and I am still kicking myself for not going when I studied abroad there.

One of the two senior authors is my buddy **Keolu Fox**, an anthropologist and human genomics professor at UC San Diego. Their paper is called “Message in a bottleneck: Nested founder effects from French Polynesia to Rapa Nui and Hawai'i,” and their findings were so jaw dropping that the elite scientific community blessed it as this month's cover story of Science.

I asked Keolu to walk me through what his team found, especially on what this means for the health of Native Hawaiians, some of whom share with the Rapa Nui distinct genetic traits that could make them susceptible to rare diseases.

This Q&A runs long, so skim my questions and jump in where it may be interesting. Keolu's team covered a lot of new ground.

When the analysis first showed Hawai'i and Rapa Nui pairing up, what went through your head?

Keolu: That we had better check it again. Those are the two most remote islands in Polynesia. Each one is more than 1,800 miles from the nearest inhabited Polynesian island, and they



Keolu Fox is an anthropologist and human genomics professor at UC San Diego.

sit about 4,400 miles from each other. Hawai'i is the only Polynesian population north of the equator. Rapa Nui is down in the cold South Pacific.

If you had to guess which two islands were least related, you might pick those two. So we came at it four different ways. Gene frequencies. The total amount of DNA people on the two islands share. The average length of the shared pieces, which tells you how recent the common ancestors are. And 2,500 family trees built by resampling the data over and over. In 61% of those trees, Hawai'i and Rapa Nui pair off by themselves. Mangareva takes that spot about 10% of the time. The Marquesas, under 3%. Every method pointed the same direction.

Who were these people?

We call them Holomoana Nui, great ocean voyagers. Their deeper roots trace to Mangareva, and behind Mangareva, the Marquesas. That matters because many of us were taught the Marquesas were the homeland of Hawai'i. Our results support the Marquesas as a dispersal center for remote Polynesia. But the founding path to Hawai'i passed through Mangareva, and the people who made the last leap north are the closest relatives of the people who made the leap south to Rapa Nui.



The heads at Rano Raraku on Rapa Nui (Easter Island) are seen in this 2012 photo. The sculptures have bodies attached, but they are buried under the dirt and not visible. (AP Photo/Karen Schwartz)

Other lines of evidence sit right on top of this. Roger Green drew a tree of Polynesian languages in 1966 that groups Hawai'i, Mangareva, and the Marquesas, with Rapa Nui as a close outlier. The DNA of the Pacific rats our ancestors carried on the wa'a shows a Hawai'i and Marquesas link too. And earlier work found voyagers

from this same corner of Polynesia reached the Americas around the same period. This was a group with the ability to reach the far edges of the Pacific, and they did.

The chant Nainoa recognized. Does science have anything to say about that?

Not directly. The genome cannot tell you which island settled which, or who sailed where after the founding. What it says is that Rapa Nui and Hawaiians share more recent ancestry with each other than either shares with anyone else in Polynesia. When oral history and the genome land in the same place, I take both more seriously.

My dad died when I was young. I got things like one stray eyebrow hair from him and the smell of his razor. That is me inheriting from one person. Explain to me what 40 people on a wa'a hand down.

Take a gene for a disease so rare it shows up in one person out of many thousands. Put that person on a wa'a with 40 people and land them on an empty island. On that island the gene is now in one person out of 40. Even twenty generations later, it may still be in about one person out of 40, because everyone descends from the same few dozen. That is a founder effect. Now stack them. The settlement of Polynesia did not go through one bottleneck. It went through a chain of them.

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The sequence we traced starts in Samoa and ends in Mangareva, and every hop in between meant a new wa'a, a new few dozen people, a new squeeze. Hawai'i and Rapa Nui sit at the end of that chain. We measured the amount of DNA people on each island share because of common founders, and remote Eastern Polynesia has the highest scores we have seen. Native Hawaiians are at once one of the largest and one of the most intense founder populations in the world.

You put a date on a wa'a landing from blood drawn today. How?

Every generation, the chunks of DNA you share with a relative get shorter, because they get shuffled. Count how many shared chunks there are in a population and how long they are, and you can estimate how many people were having children in each generation going back in time. We did that on Tahiti, where we had 581 genomes. The founding population behaved like about 800 people per generation, 34 generations ago. At 28 years a generation, that is the year 1069.

Archaeologists working from radiocarbon dates had already placed the settlement of the Society Islands between 1025 and 1120. We did not know that number when we ran ours. Then you see the population grow fast for roughly 700 years. And then, nine or ten generations ago, it drops by nearly 40%. That is disease arriving after European contact in the 1700s. The dying is still in the genomes of Tahitians walking around today.

Now the hard part. The same thing that made us 'ohana also made some of us sick.

Yes. In French Polynesia, where we had more than a thousand genomes and the sampling was designed to be representative, we report three disease variants at high frequency. Each one causes disease only when a child gets two copies, one from each parent.

About 1 in 40 people carries an ADAMTSL4 variant that dislocates the lens of the eye early in life. About 1 in 27 carries a PDE6B variant that wears down the retina and takes vision with it. About 1 in 45 carries a FAN1 variant that causes karyomegalic interstitial nephritis, a kidney disease that is ultra-rare everywhere else on earth and usually ends in kidney failure.

The American College of Medical Genetics and Genomics says once a carrier rate in a founder population passes 1 in 200, screening is medically necessary. These three run four to seven times past that line.



Keolu Fox worked with local researchers like Vahinetua Rodiere, seated at left, here on Moorea. More than a thousand people in French Polynesia shared their genomes with the team, enough to measure how often three serious disease variants show up. (Photo by Keolu Fox)

Your paper mentions gnomAD, a giant database of human DNA that labs use to tell harmless gene changes from dangerous ones. What does it miss about our people here?

The database gnomAD holds more than 800,000 genomes and exomes. It is built from whoever got sequenced, and there is no Polynesian group in it. If we are in there at all, we are scattered into other categories where no one can see us. The FAN1 variant is one example. Our team found variants carried by more than 1 in 20 French Polynesians that gnomAD does not list at all. That gap decides what gets screened.

ACMG (The American College of Medical Genetics and Genomics) uses gnomAD to recommend screening panels to anyone pregnant or planning a pregnancy for instance. A condition makes the list when at least 1 in 200 people in one of gnomAD's population groups carries it. With no Polynesian group, a condition common only among us can never reach that bar.

A young kanaka walks into a clinic in Hawai'i with failing kidneys. What happens?

In French Polynesia, kidney doctors went back through the records of patients under 45 with end-stage kidney disease. About 75% had kidney failure with no link to diabetes, high blood pressure, or obesity. Genetic testing found a cause in 32% of cases. As far as I know, no one has done that study in Hawai'i.

So the conversation here starts with diet and weight, because those are common causes doctors are trained to look for. And we have reason to think the picture in Hawai'i is different again. Hawai'i and Rapa Nui came out of their own bottlenecks, so Hawaiians likely carry clinically important variants at very different rates than Samoans and other Pacific Islanders farther west.

Then why couldn't you report numbers for Hawai'i?

Not enough data, and I would rather report nothing than report something wrong. We used Native Hawaiian genomes from the All of Us program. But the statistical power we got from AOU was low because it has insufficient representation from Hawai'i.

The Native Hawaiian genomes we did use from AOU carry a lot of recent ancestry from outside Polynesia, including a Philippines-like layer that traces to the Sakadas the sugar planters recruited last century. We used local ancestry methods to pull out the Polynesian segments from those samples, but these other ancestries further reduced the amount of data that we had from a Native Hawaiian background.

There are good reasons not to trust people who want our DNA. Why should anyone give you theirs?

Because of how the work is set up, not because of who is asking. Genomic data are not an abstract resource. They are tied to identity, to heritage, to sovereignty. Our partnerships run on transparency and community agency, and we hold to Indigenous data sovereignty, meaning the knowledge that comes out of this has to serve the health of the people the data belong to.

One of our partners, Variant Bio, is the only biotechnology company so far that shares direct benefits with the participants who make the research possible, through financial, infrastructure, and community support. The people who have historically borne the risks of research should share in its rewards. The paper notes that I am the first Native Hawaiian to earn a PhD in genome sciences. That line is in there to make a point about who leads this work.



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We were reluctant to use the AOU dataset given the lack of community consent and consensus building that was used to generate it. I am on the record [in the New England Journal of Medicine](#) saying this was a bad idea – and it looks like a lot of my

apprehension was well founded, given how **tech firms are using public health data**. However, if you're going to put the data on the internet – we're going to use it!

In the near future, we would like to build a new dataset with our lāhui – hopefully something in the 1,000+ individuals range, governed by Indigenous data sovereignty protocol and stored on our private servers in Hawai'i nei. Ideally, we recruit about 100 individuals from each ahupua'a on every island, such as O'ahu, Moku o Keawe, etc., accompanied by in-depth questionnaires with questions like, "Please note where all four of your grandparents are from."

There is a ton of evidence to support multiple and iterative waves of migration throughout the Pacific – "to and from" different islands in Hawai'i. We call this working hypothesis the "holo holo" model. The signal we're detecting in this paper is the very earliest signal. If we were to take this ahupua'a recruitment approach we could begin to create a more detailed or – higher resolution – and dynamic map of the Hawaiian diaspora throughout Moananuiākea.

What does finishing the map for Hawai'i take?

Sequencing on something like the scale we had in French Polynesia, where a thousand genomes gave us real frequencies. Enrollment on terms our communities set. Money to do it right. Then the numbers go to the ACMG and the insurers, a panel gets created, it gets reimbursed, and doctors in Honolulu have tests to order. None of that is exotic. The Finns did it. The Amish did it. Ashkenazi families did it.



Keolu Fox, right, speaks to CESEC, the council that advises French Polynesia's government on economic, social, environmental and cultural policy. With him, from left, are researchers Vehia Wheeler, Sarah LeBaron von Bryer and Eric Dawson. (Courtesy of Keolu Fox).

Last one. What do you want a Hawaiian reading this to carry out of it?

Our kūpuna crossed over 4,000 miles of open water in wā'a that held a few dozen people, and that everything our kūpuna carried, they passed down to us including variants no database on earth has recorded. And for some 'ohana, a disease a doctor here would never think to test for. We wrote in the paper that precision medicine only means something if it reaches the least, the last, the looked-over, and the left-out.

For a thousand years we were the most remote people on the planet.
We do not have to be the most remote people in medicine.

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About the Author



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Olin Lagon is a Native Hawaiian technologist, U.S. Navy and Peace Corps veteran, and cofounder of Hawai’i-born companies and organizations that have scaled to serve millions of people worldwide, like ChipIn, the first general purpose crowdfunding service, which directed over \$100 million to causes around the globe. His community work applies large-scale engineering innovation to tough challenges in Kanaka ‘Ōiwi communities, health, finance, and clean energy. He currently serves on the boards of Ceeds of Peace, Hawai’i Land Trust, ‘Ōlelo Community Media, and the Economic Revitalization Commission. The U.S. Patent and Trademark Office featured his story as a national innovator in its Journeys of Innovation series. You can reach him by email at columnists@civilbeat.org. Opinions are the author’s own and do not necessarily reflect Civil Beat’s views.



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