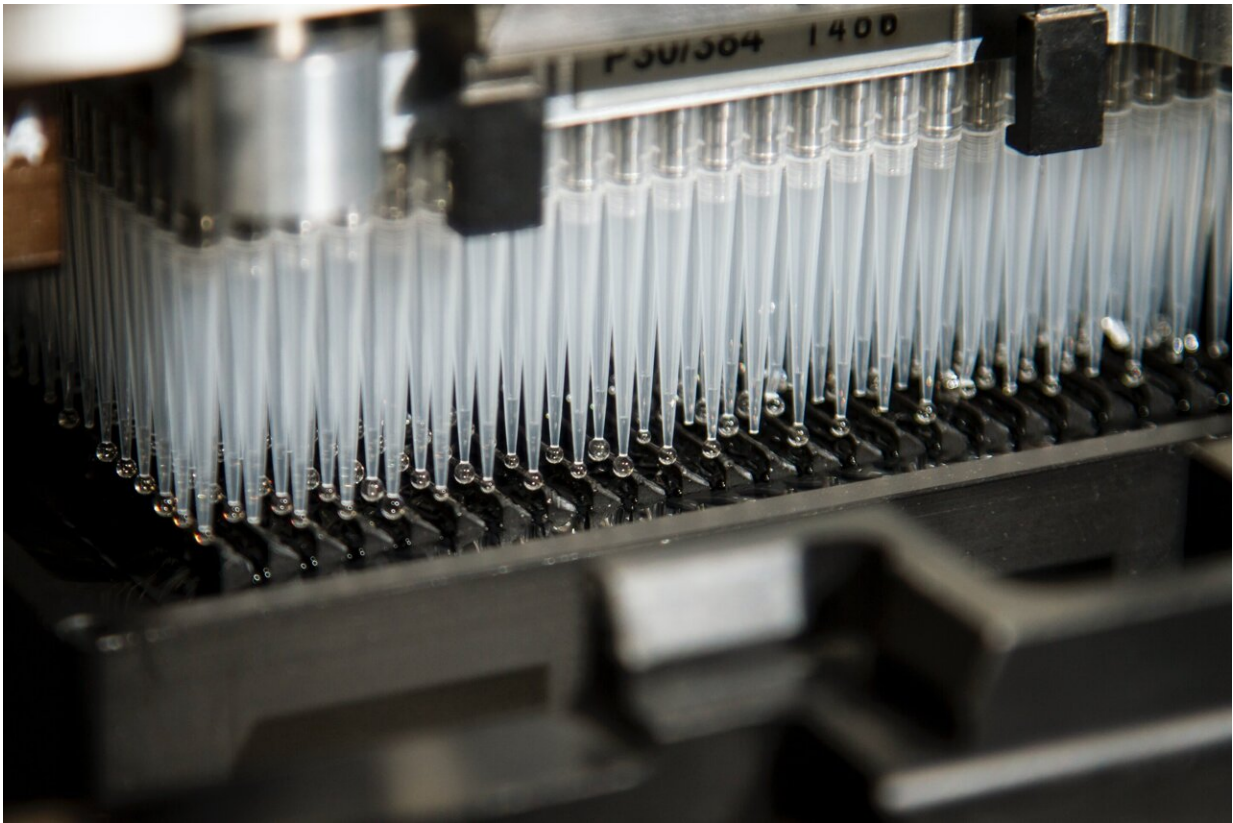


Ancient DNA yields surprising findings on world's earliest seafarers

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New genetic research from remote islands in the Pacific offers fresh insights into the ancestry and culture of the world's earliest seafarers, including family structure, social customs, and the ancestral populations

of the people living there today.

The work, described in the journal *Science*, reveals five previously undocumented migrations into a subregion of this area and suggests that about 2,500 to 3,500 years ago early inhabitants of these Pacific islands—including Guam in the northern region and Vanuatu in the southwest—had matrilineal population structures where women almost always remained in their communities after marriage while men more often moved out of their mothers' community to live with that of their wives'.

The practice is different from that of patrilineal societies where women are overwhelming the ones to leave their own community. These findings support the idea that the world's earliest seafarers were organized through female lineages.

The results come from a genome-wide analysis on 164 ancient individuals from 2,800 to 300 years ago as well 112 modern individuals. It was published by a team of researchers co-led by Harvard geneticists David Reich and Yue-Chen Liu, Ron Pinhasi at the University of Vienna, and Rosalind Hunter-Anderson, an independent researcher working in Albuquerque New Mexico.

"It's an unexpected gift to be able to learn about cultural patterns from [genetic data](#)," said David Reich, a professor in the Department of Human Evolutionary Biology and a professor of genetics at Harvard Medical School. "Today, traditional communities in the Pacific have both patrilineal and matrilineal population structures and there was a debate about what the common practice was in the ancestral populations. These results suggest that in the earliest seafarers, matrilineality was the rule.

The genetic analysis compared early seafarers from Guam, Vanuatu, and

Tonga—living about 2500 to 3,000 years ago—revealing that their mitochondrial DNA sequences, which humans only inherit from their biological mother, differed almost completely while sharing much more of the rest of their DNA. The only way this can happen is if migrants who left their communities to marry into new ones were almost always males.

"Females certainly moved to new islands, but when they did so they were part of joint movements of both females and males" explains Reich.

"This pattern of leaving the community must have been nearly unique to males in order to explain why genetic differentiation is so much higher in mitochondrial DNA than in the rest of the genome."

The new study from an interdisciplinary team of geneticists and archeologists quintuples the body of ancient DNA data from the vast Pacific region called Remote Oceania, the last habitable place on earth to be peopled. It also provides surprising insights into the extraordinarily complex peopling of one of Remote Oceania's major subregions.

Humans arrived and spread through Australia, New Guinea, the Bismarck Archipelago, and the Solomon Islands beginning 50,000 years ago, but it wasn't until after 3,500 years ago that humans began living in Remote Oceania for the first time after developing the technology to cross [open water](#) in unique long-distance canoes.

This expansion included the region called Micronesia: about two thousand small islands north of the Equator including Guam, the Marshall Islands, the Caroline Islands, Palau, and the Northern Mariana Islands.

It's long been a mystery what the routes people took to arrive in the region. The revealing of five streams of migration into Micronesia helps bring clarity to this mystery and the origins of the people there today.

"These migrations we document with ancient DNA are the key events shaping this region's unique history," said Liu, a post-doctoral fellow in Reich's lab and the study's lead author. "Some of the findings were very surprising."

Of the five detected migrations, three were from East Asia, one from Polynesia, and a Papuan ancestry coming from the northern fringes of mainland New Guinea. The indigenous ancestry from New Guinea was a major surprise as a different stream of this migration—one from New Britain, an island chain to the east of New Guinea —was the source of the Papuan ancestry in the southwest Pacific and in Central Micronesia.

The researchers also found that present-day Indigenous people of the Mariana Islands in Micronesia, including Guam and Saipan, derive nearly all their pre-European-contact ancestry from two of the East Asian-associated migrations the researchers detected. It makes them the "only people of the open Pacific who lack ancestry from the New Guinea region," Liu said.

The researchers consulted with several Indigenous communities in Micronesia for the study. This is the fourth publication of original ancient DNA data from remote Pacific islands by Reich's group.

"It's important that when we do ancient DNA work, we don't just write a paper about the population history of a region and then move on," Reich said. "Each paper raises as many new questions as it answers, and this requires long term commitment to follow up the initial findings. In the Pacific islands there are so many open questions, so many surprises still to be discovered."

More information: Yue-Chen Liu et al, Ancient DNA reveals five streams of migration into Micronesia and matrilocality in early Pacific seafarers, *Science* (2022). [DOI: 10.1126/science.abm6536](https://doi.org/10.1126/science.abm6536).

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