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The Tie That Binds Us? Challenging the Primacy of DNA in Kinship Studies and Re-Centring Community in Defining Human Connections across Time

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Abstract

Biological determinism continues to shape how kinship is defined, from research to repatriation proceedings. This privileging of biological relatedness reflects and reinforces dominant 'Western' frameworks of kinship, often sidelining culturally-specific, Indigenous, and community-centered understandings of family and social belonging. Advances in archaeogenomic technologies today offer unprecedented insight into past human societies, and these advances have the potential to forge new, multivocal, and inclusive approaches to kinship. However, the application of ancient DNA risks reproducing power imbalances and epistemic hierarchies when genetic connections are assumed to be the primary or sole measure of social ties. This paper examines the conceptual and ethical implications of privileging DNA as a measure of kinship, emphasizing how such practices can obscure complex social realities, undermine self-determination, and reify narrow and essentialist understandings of identity. We call for critical reflection about the agents and motivations of archaeogenomics research, on the role of genetics in defining relationships and urge that multiple knowledge systems be considered in studies of kinship, both past and present.

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Why this matters: situating the discussion in present-day dynamics

In 2013, police removed a seven-year-old child from the custody of her parents in Dublin, Ireland, solely on the basis of her hair colour—she was blonde in a Roma family (McDonald 2013)—in a clear act of racial profiling (Walsh & Krieg 2007). They returned the child to her parents only after DNA testing confirmed their biological relationship. This case was not isolated; similar familial separation acts took place in the same period in multiple European countries. This sadly but neatly exposes the primacy of biological relatedness embedded in conceptions of kinship employed by 'Western'[1] power structures as exemplified by substantiating the use of police activity to act on superficial, unreliable measures of biological relatedness and the use of DNA testing to reunite the family to tell them what they already knew, that they are kin.

The biologically deterministic use of DNA and the centricity of dominant 'Western' views of kinship have saturated anthropological and archaeological studies for decades, but have never been adequately confronted (Jackson *et al.* 2021). This is part of a general issue created by the dominance and imposition of non-Indigenous, outsider-academic frameworks to research Indigenous peoples and local communities, as exemplified in Bronisław Malinowski's ([1922] 2002) articulation of the goal of anthropology: rendering global communities understandable to 'We Europeans'. In 1984, David M. Schneider called for an abandonment of kinship studies due to their inherently Eurocentric roots; he pointed out that 'Western' scholars were imposing their societies' opinions 'on all peoples, insisting that kinship consists in

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relations of consanguinity and that kinship as consanguinity is a universal condition' (Schneider 1984). Global Indigenous scholars have expressed concerns about the use of DNA to supplant Indigenous community-defined kinship structures (Harry 2009; TallBear 2007).

Today, advances in genomic and ancient DNA (aDNA) technologies allow researchers to study biological relationships between individuals across time and space, which in turn reveal new details about past societies, including their interactions, social organization, diversity and transformations. Learning about the past could help today's societies critically reflect on themselves. Conversely, however, the current-day focus on DNA connections in interpreting past social organization is arguably making matters worse. There is little discussion yet on the appropriateness, utility and limits on the use of DNA to define relationships and social connections of 'mutual being', i.e. kinship (Sahlins 2013), either in anthropological or in archaeogenomic studies. Kinship as reified via DNA is gaining new dimensions and becoming an urgent issue as genetic data becomes readily accessible both to scholars across various disciplines and also to lay members of the public through the widespread use of commercial genetic ancestry testing.

Kinship ties across time

Through the use of two case scenarios, we argue that kinship studies demand a fundamental rethinking that is not reliant on DNA to reify and legitimize social ties. How kinship is treated is a complex question involving identity and community, ownership and repatriation, rights, monetary benefits and, ultimately, justice. We call for research practices that ensure that: the benefits of DNA applications are equitable; potential harms are minimized; and historically disempowered communities are not further burdened by entrenched inequalities and discriminatory attitudes arising from DNA applications. This, we argue, is only possible by involving members of those communities in research and having explicit research agendas that prioritize benefit to stakeholder and rights holder communities. We hope to ignite—across all fields involved—a critical reckoning and revisioning to ensure that the benefits of DNA applications are equitable and potential harms are minimized and not overly burdened by those historically disempowered.

The Chaco Canyon controversy around using aDNA to define kinship

Chaco Canyon, a UNESCO World Heritage Site managed by the US National Park Service, is one of the most significant archaeological and cultural centres of the Ancient Puebloans. Today, many Pueblo Nations—including Hopi, Zuni, Laguna, Acoma, and others—along with the Diné (Navajo Nation) maintain deep cultural, historical and spiritual connections to Chaco and its Ancestors.

In 2017, researchers obtained access through the American Museum of Natural History (AMNH) to ancestral remains from Chaco Canyon for destructive sampling in order to extract aDNA and reconstruct matrilineal kinship patterns (Kennett *et al.* 2017). This process required irreversibly destroying bone fragments that had survived from between 800 and 1130 CE. However, the study was carried out without any consultation with Pueblo or Diné communities, nor were they informed prior to publication (Cortez *et al.* 2021). Tribal leaders only learned of the research when journalists—among them Michael Balter—contacted them for comment days before the article's release (Balter 2017).

The controversy surrounding the study centres on how 'kinship' and cultural affiliation have been defined legally and scientifically. During its NAGPRA (Native American Graves Protection and Repatriation Act) inventory process in the 1990s, the AMNH claimed that Chacoan Ancestors were not culturally affiliated with living Tribes. Yet Pueblo oral traditions, archaeological evidence and the geographic context of Chaco—situated adjacent to Navajo Nation lands—support clear ties to present-day Puebloan and Diné communities. Notably, the 2017 study itself acknowledged connections to Pueblo peoples when framing its research, even though those same connections had been dismissed in the NAGPRA context. As Cortez *et al.* (2021, 165) observed, '[t]he scientific evidence was interpreted in two different ways: in one context, it was used to deny a determination of cultural affiliation under NAGPRA; in the other, it was used to support a research question outside of NAGPRA'.

Cortez and colleagues' ethnographic study (2021) of this controversy examined the publication, media coverage and the decision-making processes that allowed the research to proceed without consultation. The authors documented how institutional path dependencies and gaps in NAGPRA enabled this breach of ethical practice. They further criticized the language of the aDNA study for its dehumanizing references to Ancestors as 'crania' (e.g. 'mother–daughter relationship suggested between crania 1 and 7'). We wonder if such dehumanizing language would be used in studies of European royalty, especially considering that even archaeogenomicists involved in the study acknowledged the elite status of this Chacoan 'matrilineal dynasty'. In response to cases like this, NAGPRA is now undergoing updates intended to better prevent similar actions by museums and researchers.

While some scientists may view aDNA solely as a tool for reconstructing human history, research in contexts where ancestral ties remain active and politically significant requires sensitivity to contemporary Tribal sovereignty and cultural protocols. Viewing the impacts of aDNA findings as a purely scientifically neutral act is a privileged, outsider perspective that ignores the real-life dynamics raised by aDNA for establishing or even discrediting land or resource claims by present-day Tribal Nations (Kowal *et al.* 2023). For example, in 2025, a local news report (Brown 2025) detailed ongoing negotiations between Pueblo groups, the Navajo Nation (Becenti 2025) and federal agencies regarding oil and gas leasing in the Chaco area. Concurrently, Pinotti *et al.* (2025) published an aDNA study on Ancient Puebloan kinship connections to contemporary descendants. Notably, the researchers engaged only one culturally affiliated Tribal group in this politically and culturally sensitive region, a decision that may inadvertently position that group as

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having a uniquely substantiated connection to Chacoan Ancestors through genetics. This raises another concern related to the privileging of genetic data over other long-established forms of evidence. *Nature* promoted the Pinotti *et al.* study under the headline 'Indigenous American tribe's ancestral history confirmed by genomes'—implicitly suggesting that oral traditions and archaeological knowledge were insufficient until 'validated' by genetics.

The Penn Museum and the remains of Black Philadelphians

In another example, the Museum of Archaeology and Anthropology at the University of Pennsylvania (known as the Penn Museum) recently used genetic relatedness as a proxy of kinship to delegitimize claims by descendant communities (Monteiro 2023). In the wake of an international condemnation about the Penn Museum holding the remains of two children killed in the 1985 bombing of the Philadelphia MOVE group by the police and the discovery that these individuals' remains were being used in anthropological teaching collections, the museum had announced that it would lay to rest the remains of Black Philadelphians held at the Penn Museum as part of the Morton Cranial Collection. Perhaps they hoped that this move would appear proactive; however, this was directly counter to calls from the community for their return and reburial (Muhammad & Monteiro 2023).

In 2024, the remains were placed in an above-ground mausoleum where, as the museum director mentioned at the ceremony, they would still be accessible by the Museum. This was not laying them to rest, as their community had wished, but left them vulnerable to future use by the Museum. Additionally, the director suggested that they would be repatriated to their biological descendants. This logic, which relies on a purely biological definition of kin, was clearly undermining the connection/kinship claims and agency of the descendant community. Simultaneously, the Museum's stance implied that those without biological children do not deserve the same care in death. The Penn Museum was abusing DNA to ignore the community's wishes, thus effectively perpetuating the legacy of injustice and violence.

Legal implications of using DNA as an arbiter of kinship

The Ancient One, also known as Kennewick Man, was uncovered by water erosion in the Columbia Basin of Washington State in 1996. Although the Confederated Tribes of the Umatilla Indian Reservation won an initial court case to rebury the Ancient One, their connection to their Ancestor was challenged by scholars who felt that the Ancient One's return would constitute a lost opportunity to conduct research, and this court decision was later overturned on appeal. For the next 20 years, the Ancient One was housed at the Burke Museum at the University of Washington (Owsley & Jantz 2014) and was only repatriated once genetic analyses, deemed as evidence enough to demonstrate kinship connections over oral tradition and geographic connection, genetically demonstrated relatedness to Indigenous communities in Washington state, including the Confederated Tribes of the Colville Reservation (Rasmussen *et al.* 2015).

Tallbear (2013a) examined how colonial states and institutions have the power to shape and unilaterally determine standards around how knowledge is produced. She noted that '[i]n arenas in which both indigenous people and scientists are invested, scientific activities are often granted exclusive jurisdiction over knowledge production' (Tallbear (2013a, 2). In this instance, the case was held and appealed in the United States court system, the judicial arm of the state. And while the court initially sided with repatriation and reburial requests, that decision was appealed and only revisited when evidence that adhered to the US government's epistemological preferences (in the form of aDNA results) was submitted. As Harry of the Indigenous People's Council on Biocolonialism (IPCB) noted in a 2005 interview (Richards 2005), '[t]his is pitting one knowledge system against another'. This is where the danger of using DNA to determine identity arises. It sets a precedent that cedes control of defining identities to the preferred epistemology of the state. It creates a hierarchy of methods of knowledge production that places genetic ancestry above other forms of identity production, such as those based on kinship, territory, geography and myriad other cultural articulations of identity. Tallbear (2013a) noted that genetic articulations of identity 'even without exploitative intent—can undermine Tribal and First Nations' self-determination and the global Indigenous anti-colonial movement'. The implications of this purported hierarchy are far-reaching and these questions of identity articulate with access to resources. This can be in relation to territorial claims or financial issues, as with large-scale human genetic diversity projects to map migratory movements (e.g. Genographic Project) and aims to sequence and publicly share tens of thousands of genomes from Indigenous people worldwide without acknowledging valid, non-DNA kinship structures by participant communities (Harry & Dukepoo 1998; TallBear 2013b).

Commercializing kin

In the courtroom, DNA has been mobilized to serve the epistemological preferences of the state and dominant social groups, and in the marketplace, it has been commodified to sell identity, ancestry and belonging to consumers, with companies often intentionally conflating social and genetic definitions of relatedness, kinship and community.

The direct-to-consumer ancestry testing company 23andMe[2] was recently promoting its Historical Matches[SM] feature with the following description (23andMe 2024):

> Are you distantly related to the legendary, like the great musical genius Ludwig Van Beethoven? Perhaps you are genetically related to a high-status Viking woman from the 9th century who was buried in an ornate coffin with ornaments made of copper and a comb made from antlers. [. . .] Woven into our DNA is a history thread linking us to our relatives, their stories, and the broader human story.

What could be wrong with people wishing to use commercial ancestry tests to explore their past and

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associate with historical personalities or events? We can see multiple issues. First, people connecting with cultural events or personalities in human history through the presence of some presumed DNA connections can only limit, if not bias, their connections with past heritage. A person being a descendant of a notorious historical criminal does not implicate them, just as being a newfound genetic descendant of Ludwig Van Beethoven or Marie Skłodowska-Curie does not mean that someone has inherited more of their cultural contributions to humankind than others. This type of genetically based and individual-focused association undermines the notion that human history and cultural heritage belong to all humanity.

Second, such practices and ideologies hold strong potential to entrench problematic personal attitudes towards oneself or others. Strand and Källen (2021) conducted interviews with genetic ancestry test customers who had received results suggesting genetic relatedness with Vikings. Quoting one of the respondents: 'It made sense, because there was a lot of violence in my family. The Vikings were called berserkers, and some people think that the berserker trait was genetic. I can see it among the men in my family.' The implication should be obvious: individuals believing that their behaviour is genetically coded might believe that they cannot change that behaviour. This quoted participant was not an isolated case, but represented the general attitude among the study's participants. In fact, that genetic testing can consolidate genetic essentialist and racist views has also been shown by an empirical study conducted by Roth *et al.* (2020). Here, the authors showed that many participants without additional genetic training were inclined to develop more essentialist views after taking an ancestry test.

Ancient DNA studies on kinship and genetic relatedness

For the last 15 years, aDNA research results have been systematically used by racist groups to confound genetic populations with cultural/ethnic entities (Hakenbeck 2019), a fallacy sometimes aided by reductionist approaches in the original research articles. A thoughtful critique of such genetic essentialist approaches in aDNA research by Megan Gannon (2019) argued, '[i]f ancient DNA researchers perpetuate the idea that fixed ethnic identities, rooted in genetics rather than culture, existed in the prehistoric past, they perpetuate the idea that we have static ethnic identities, rooted in genetics, today'. The same is true for how archaeogeneticists discuss genetic relatedness and kinship. If researchers treat genetic relatedness as the primary factor in determining social connections, that can serve to naturalize the present-day focus on primacy given to DNA in determining kin and community, as discussed in the case studies above.

While privileging DNA risks narrowing our understanding of kinship, ethnographic research has vividly shown how human societies have organized kinship and belonging on grounds other than genetic relatedness (Sahlins 2013). Today, aDNA research is contributing to this line of work. Studies of burials in Upper Palaeolithic and Mesolithic sites (Sikora *et al.* 2017; Simões *et al.* 2024) or of subfloor burials in houses at the Neolithic site of Çatalhöyük, Turkey (Yaka *et al.* 2021; Yüncü *et al.* 2025), indicate that genetic connections were not the main determinant of burial location/proximity in these societies. Fluid social structures were likely common in prehistory as today (Hill *et al.* 2011; Pilloud & Larsen 2011). The aforementioned Çatalhöyük study also showed how kinship practices could change within a community across generations, possibly through the spread of fostering and/or adoption-like practices (Yüncü *et al.* 2025).

Lack of genetic relatedness is the null hypothesis when performing a genetic test for relatedness. Likewise, social relations within a community not being fixed and not being centred on genetics should also be the null hypotheses in aDNA studies of social organization.

Where to go from here?

The cases discussed here show that the use of DNA to define kinship, community and belonging is neither neutral nor inevitable, and can lead to significant harm. Meanwhile, the revived discussions around identity, community and kinship triggered by studies in ancient DNA also have significant potential for moving forward by bringing archaeologists, geneticists and communities into communication. Moving forward requires sustained attention to how genetic evidence is mobilized, by whom, and for what purposes. We make three recommendations.

First, researchers, museum curators and policymakers must prioritize consultation and consent and recognize the legitimacy of multiple knowledge systems (Kowal *et al.* 2023). They should avoid solely using biology-based definitions of kinship, and more importantly, prevent such definitions being used as a tool for reproducing present-day power asymmetries among peoples that result from historical injustice, including violence against discriminated communities today.

Second, there is a need for stronger interdisciplinary collaboration, across genetics, archaeology and anthropology, as well as with descendant and stakeholder communities. This will help research move beyond genetics as a test of other epistemologies, and instead will foster an integration of genetic research with oral histories, cultural traditions, or community definitions of kin, engaging with these forms of knowledge on equal terms. Such work could start with developing clear terminology to prevent confounding between kinship and genetic relatedness. We suggest using 'genetic relatedness' to refer to genetic connections and 'kinship' to refer to social connections that are produced and maintained through social processes. Here, avoiding the term 'social kinship' could help cause confusion by implying that kinship can be divided into 'genetic' and 'non-genetic' domains; in reality, all kinship is inherently social, embedded in practices, obligations and cultural understandings (Cveček, Raghavan & Bickle, this issue). Genetic ties and kin ties sometimes overlap, sometimes not.

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The third involves agency. Most anthropological, genetic and aDNA research across the world has been conducted typically by Western scholars or Global North laboratories from a Eurocentric perspective, and with little or no attention to social impact. As we demonstrated here, producing knowledge about human societies is not a neutral act, but a political one. Ancient DNA studies capture the public imagination and are poised to have a substantial and positive impact. However, this is only possible if knowledge production involves community engagement and interdisciplinary collaboration throughout the research process, and if researchers adopt a framework that considers the broader impacts of such studies by asking why kinship research is conducted, who benefits from it, and whether people or communities may be harmed or exploited, directly or indirectly, through the consolidation of asymmetric power relations. Research can only benefit societies when it engages multiple actors through clear programmes and direct collaboration with all affected communities.

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Notes

1 We opt to place the word 'Western' in quotation marks as there is no clear standard to demarcate the geographies, ideologies, cultures and histories from non-'Western' approaches.

2 23andMe filed bankrupcy in early 2025, attributed to declining customer interest and a major data breach affecting nearly 7 million customers' data. www.npr.org/2025/03/24/nx-s1-5338622/23andme-bankruptcy-genetic-data-privacy

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