Title: The power of identification: Transnational scientific network of identifying Vietnam’s MIAs remains
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Abstract
This paper examines the diverse visions, interests, and practices shaping the development of a transnational scientific network involving Vietnam, ICMP, and USAID for identifying Vietnam's MIA remains. Based on participant observation in collaboration meetings, scientific workshops, and forensic laboratories, the first part of the paper focuses on the differing visions and sometimes competing interests among key stakeholders regarding project methods and priorities. The second part delves into the forensic processes of bone cleaning, cutting, and grinding to transform bone fragments into powder for DNA extraction, raising questions among Vietnamese researchers about whether the leftover bone powder still retains the personhood of the war dead. More broadly, the paper highlights how Vietnam's MIA remains are entangled in geopolitical maneuvers, contributing to the Vietnam-US comprehensive strategic partnership amid global tensions between the US and China.

Introduction
On July 25 2023 under the blazing heat of Hà Nội, US Ambassador to Vietnam, Marc Knapper, arrived at the Center for DNA Identification (CDI) in Cổ Nhuế to mark an international collaboration between Vietnam and the US in addressing US war legacies in Vietnam. More particularly, the collaboration aims to develop the latest DNA technology to identify the remains of over 300,000 Vietnam's Missing in Actions (MIAs). Through a funding of 7 million USD administered by the USAID, Vietnam Academy of Science and Technology (VAST), the host institution of CDI, is cooperating with the International Commission of Missing Persons (ICMP), a non-governmental forensic laboratory and organization based in the Hague, the Netherlands, to improve technical capabilities of Vietnamese forensic scientists in applying latest developments in DNA technologies to identify high-degraded Vietnam’s MIAs remain samples. In his speech, the Ambassador congratulated both ICMP and CDI on their success in “optimizing a nuclear DNA extraction protocol that will address Vietnam's challenges of identifying human remains.” The Ambassador also emphasized the “commitment to support Vietnam's effort to identify human remains from the war is unwavering” as the US “stand side by side with Vietnam.” This collaborative DNA identification project is part of a larger political plan to elevate the political ties between the US and Vietnam from a Comprehensive Partnership to a Strategic Comprehensive Partnership on all fronts, including military and national defense of the Asia-Pacific region. My research explores the visions, interests, and practices of the key stakeholders embedded in the transnational scientific network, more specifically the technology transfer and knowledge exchange, between Vietnam, ICMP and USAID.

Previous research in science and technology studies (STS), more particularly, the science and politics of death (Verdery, 1999; Wagner, 2008, 2019; Aronson, 2016; Rosenblatt, 2015;
Toom, 2016; Smith, 2017; Ngo, 2021) demonstrates that the use of (forensic) science to identify, manage, and own the dead allows states to foster a national identity, and in some cases, a war discourse. Anthropologist Sarah Wagner (2019) explores the politics of the war dead in her work on the identification and return of America’s MIAs from the Vietnam War that further fosters American identity and becomes part of an “industry of memory” that enables America to wage wars on countries, deemed as external threats to America. My paper shifts away from the role of the war dead in waging new wars in the US context to examining how the Vietnamese war dead plays a role in advancing Vietnamese science and transforming US-Vietnam relations “from former foes to partners.” From the political perspective, the Vietnam-American war ended in 1975, and the US has actively been looking for American remains in Vietnam since the 1980s (Wagner, 2019). Why is the American interest in helping Vietnam search and identify Vietnamese war dead only taking shape in the early 2010s? More succinctly, why now? From the scientific perspective, what are the challenges in identifying the remains of the Vietnamese war dead that have been buried in the highly acidic soil of Vietnam for over five decades? How do international forensic experts of the ICMP collaborate with Vietnamese researchers on overcoming the technical challenges of the remains? What kinds of potential conflicts, but also friendship, have emerged from this transnational, cross-cultural scientific collaboration? And more importantly, amidst the advice or practices of the international forensic experts, how do Vietnamese scientists and officials maintain their values, knowledge and practices when working with the materiality and spirituality of the remains?

This paper reflects twelve-month long ethnographic fieldwork in Vietnam. I conducted participant observation in collaboration meetings and scientific workshops between ICMP, USAID, and CDI. I also interviewed and engaged in repeated conversations with scientists and stakeholders from all three agencies. A big part of my fieldwork also involved weeks-long participant observation in the forensic laboratory from bone cutting to DNA extraction process. During the course of my fieldwork I paid attention to the official narratives and stated goals of this DNA identification project and how those official goals are played out or actualized in the scientific workshops and meetings. I also attended to the challenges that arose from the international collaboration between USAID, ICMP and CDI surrounding the high degradation of Vietnamese war dead’s remains as well as the need for a centralized DNA database management system in Vietnam. I also spent months with Vietnamese researchers at CDI in the laboratory, in their offices, and in casual settings like lunch and dinner to understand their values and practices.

In the first part of this paper, I delve into the unique technical challenges associated with Vietnamese remains. These challenges require the development of new DNA extraction protocols as well as next-generation sequencing methods which are the focus on the ongoing collaboration between ICMP and CDI. I also discuss the difficulties around ICMP’s objectives to develop a centralized DNA management system to help assist large-scale DNA matching in Vietnam. In the second part I go into detail about the forensic processes of transforming bone specimens into bone powder and in clear lysate solution to extract DNA from the bone remains.
which I observed at CDI. In doing so I explicate the processes of bone cleaning, cutting, and grinding to obtain a certain amount of bone powder for a total demineralization process. What interests me the most about this process is the debate among Vietnamese researchers on whether to discard the leftover bone powder after the total demineralization process. While some scientists opt for discarding the bone powder to avoid contamination, some prefer keeping the powder for further testing. The core issue among the Vietnamese researchers, more particularly, is whether the leftover bone powder still retains the personhood of the martyrs. This raises an interesting discussion on the entanglements between science and spirituality in Vietnamese identification practices.

The Vietnamese researchers speak back

Scholarly work in postcolonial science studies has highlighted the agency and efforts of scientists of color from the postcolonial state to shift away from the shadow of the Western hegemonic power in technology transfer and scientific development (Fullwiley, 2014; Sung, 2010; Liu, 2010; Sun 2017; Hurlbut, 2017). For example, in the context of personalized medicine research in Singapore, ethnographer Shirley Sun (2017) analyzes the attempts of scientists in Asia to move away from the shadow of Western genetics research that treats “Asian” as homogenous racial groups in opposition to “the Caucasian.” In the context of global health, science studies scholar Benjamin Hurlbut (2017) analyzes an example of Indonesia opting out of sharing H5N1 flu virus samples of their populations to the global scientific community, using their political sovereignty as a legal justification to consider the samples as a national "natural biological resource" protected under "viral [national] sovereignty." The example of Indonesia versus the WHO provides an important example of how the political sovereignty of a developing country in the Global South can call into question the regime of sovereign science and the logic of natural commodification imposed by powerful countries and organizations. As such, rather than portray Vietnam as a passive recipient of DNA forensic technology from Western agencies, my fieldwork attends to ethnographic moments in which Vietnamese forensic scientists and researchers voice their concerns and express their interests to their Western counterparts as equal and active participants in this transnational scientific collaboration. During the first months of my fieldwork, I observed how Vietnamese scientists persistently insisted on the development of SNP-based technology, instead of going with ICMP’s standard protocol of using short-tandem repeat (STR) analysis. As Vietnamese scientists have an adept knowledge about the bone remains from Vietnam, they understand that SNP-based technology is better suited to identify Vietnamese remains that are more highly degraded than most bone samples with which ICMP normally deals.

From a wide, well-paved Phạm Văn Đồng highway, our car turned into more rural-looking neighborhood of Cổ Nhuế ward, Bắc Từ Liêm district. Here, it was common to spot herds of buffaloes, goats, and cows grazing by the roadside, amidst notable landmarks such as an international hospital, Hanoi University of Mining and Geology, and the People's Police Academy. At the far end of a notably rough street, riddled with potholes resembling small ponds,
stood the Center for Forensic Identification (CDI). Nestled within the Cổ Nhuế Technology Research and Development Zone, a sprawling area under the jurisdiction of the Vietnam Academy of Science and Technology (VAST), CDI served as a crucial hub for forensic investigations. Every time I took a Grab car to CDI, I warned the driver ahead of time that they would travel through a bumpy stretch of road to get to my destination, “Even Vietnam’s Prime Minister and US Ambassador had to sit through this bumpy stretch, there is no other way around this” my word of comfort for the driver.” Under the early July heat in Hà Nội, I arrived at Cổ Nhuế Technology Research and Development Zone for a preliminary scientific meeting between USAID, ICMP and CDI to discuss DNA extraction results from 55 Vietnam’s bone samples which had been transferred to ICMP’s headquarter in the Hague for testing and analysis six months earlier. Undergoing renovation to prepare for an upcoming interorganizational week-long workshop, the meeting took place at the Center for Applied Research on Stem Cells and Gene Therapy, a building next door to CDI which is also a part of VAST. Meeting attendees included the director, forensic researchers and staff of CDI, project manager and logistics assistant of ICMP, and Deputy Director and his project assistant of USAID, along with DNA laboratory manager and DNA extraction researchers of ICMP in the Hague joined through Zoom. After a 20-minute presentation by ICMP’s DNA laboratory manager, the director of CDI voiced his uncertainties about the inconclusive results of how many DNA extracted samples were successfully performed, how many samples could be used for downstream bioinformatic analysis, and which DNA extraction method or protocol could be transferred to Vietnam. ICMP’s DNA laboratory manager on the Zoom screen kept his responses vague and suggested further discussion in person at the upcoming week-long workshop taking place in two weeks in Hà Nội, Việt Nam. ICMP also stated that they required family reference samples for conducting DNA matching analysis, but they had yet to receive any. The CDI director argued that the project should focus on perfecting the extraction and technology transfer first, before moving to matching family reference samples. Due to the political sensitivity of this topic, the CDI director stressed that the workshop should focus mainly on DNA extraction techniques and not be concerned with family reference matching until actual success with extracting DNA from bone samples first.

At the time of writing the director had been promoted to an administrative department within VAST, ending his tenure as director of CDI by the end of 2023. A man in his late 30s with a PhD in Biochemistry from a university in the Netherlands, the director was well-known among his staff and colleagues more as a diplomat than a scientist. Among his staff, he was generous with team building activities and flexible in regard to time management and work schedules. Membership in the Communist party is a prerequisite for holding high-level positions at CDI and VAST. As a Communist Party member with a family background in the Party, he is skillfull in establishing good social relationships with his staff as well as individuals inside and outside the government. An incredibly busy man, he spent most of his work days running between meetings at different government offices. In a car ride to CDI the day after the preliminary online meeting with ICMP, the director informally shared with me that he was not
surprised about the lack of confirmed results from ICMP in the meeting the previous day. The
director understood that a shortage of staff and experts at ICMP in the current years led to their
slow progress on developing new DNA technology to deal with challenging Vietnamese
samples.

ICMP’s standard protocol for DNA extraction is STR (short-tandem repeat) analysis,
which involves examining specific regions in the DNA where short sequences of nucleotides are
repeated. This method is crucial for accurately matching and identifying missing persons by
comparing the variations in repeat lengths within these highly polymorphic regions. However,
the traditional STR method of ICMP does not work well with highly DNA degraded bone
samples of Vietnam. STRs need DNA fragments that are comparatively long, 150-350 base pairs
or more. DNA fragments from Vietnam samples, due to its high degradation, are less than 100
base pairs. In fact, preliminary experiments have shown that DNA fragments successfully
extracted from Vietnamese samples are merely 40 to 50 base pairs. This requires a new approach
using massive parallel sequencing (MPSpelix), also known as next-generation sequencing (NGS),
to accommodate shorter DNA fragments, or single nucleotide polymorphisms (SNPs), and
enable the analysis of multiple loci, providing a more comprehensive and informative DNA
profile.

The new DNA sequencing approach enhances the power of identification than the
traditional method currently being employed at CDI of focusing only on mitochondrial DNA
(mtDNA), passed maternally and possessing high stability, allowing for identification of
individuals or maternal lineages when nuclear DNA is degraded or unavailable. mtDNA was, in
fact, the goal standard of forensic DNA in the 1980s and 1990s due to its abundant copies per
cell, ranging from hundreds to thousands copies, and its resilient structure, which enabled it to
stand against the test of time and degradation in ancient DNA bone analysis. However, mtDNA
has lower discriminatory power compared to nuclear DNA, which restricts its ability to uniquely
identify an individual and distinguish between individuals within a population with shared
maternal ancestry. Therefore, mtDNA cannot be used as a unique identifier, but only be used
when other non-DNA evidence exists to affirm kinship relations. In the case of Vietnam where
hundreds of thousands remains, ranging from 50 to 70 years old remains, have not been
identified and only single and/or distant relatives are alive and available, the need for MPSpelix
and SNP-based analysis is required and requested by Vietnamese scientists and agencies at CDI
and IBT. The problem remains: up until the collaboration with Vietnam, ICMP has not worked
with MPSpelix technology, and, hence, how does ICMP transfer technology which they don't
have? And, this explains the lack of clarity in the presentation of ICMP and their initial advice
for Vietnam during the aforementioned hybrid meeting to reconsider using the ICMP-standard
STR method to do high throughput analysis of Vietnam's samples. This piece of advice received
a lot of push back from Vietnamese scientists at VAST involved in the project who insisted on
MPSpelix or NextGen sequencing as the most suitable technology to move forward.

In the same car ride, the CDI director also confided in me that ICMP might have
mistaken the younger generation of Vietnamese scientists for being compliant to the West as the
older generation of Vietnamese scientists had been. The younger scientists are now better trained and informed about scientific progress and advances in the field. Therefore, they would not blindly accept any method or technology the West imposed on, or transferred to, them. All the staffers at CDI are from the Northern region of Vietnam. Most of them either held a Bachelor’s or a master’s in biology, biochemistry, or biotechnology from public universities in Hà Nội, Korea, and Australia. Three researchers in their mid-20s and early 30s are pursuing a PhD in Bioinformatics at VAST, one of whom is focusing on ancient DNA of Vietnam. During the technical workshop two weeks after the preliminary meeting, some younger scientists voiced their concerns and feedback to ICMP foreign experts. One of the feedback involved challenging the reference population database of the Vietnamese employed in kinship simulation analysis by Dr. Thomas Parsons, the former Director of Forensic Science at ICMP and now senior scientific advisor for the Vietnam DNA identification project. Dr. Parsons employed kinship simulation to reconstruct potential familial relationships using 120 Vietnamese-Kinh population genome references from the 1000 Genomes consortium project. This simulation involves using allele frequencies of the population to generate a genotype or a genetic profile of a typical person of the population, repeat that about 10,000 times, and for each genetic profile, generate another genotype that is related to the first person like a sibling would be in order to ascertain kinship links, such as parent-child or sibling relationships, offering crucial insights that aid in the accurate identification of missing individuals through their relatives. Lang,¹ in their mid-20s currently pursuing a PhD in genetics, questioned the validity of the population reference genome of the Vietnamese employed by Dr. Parsons. Lang argued that the reference sample consisted only of Vietnamese-Kinh individuals mainly from Ho Chi Minh city. Vietnam has 54 ethnic groups, and, therefore, to Lang, the population reference genome in the 1000 Genomes project, does not represent the Vietnamese population.

While the variations in SNP sites between the Vietnamese Kinh and the other 53 ethnic groups, to Dr. Parsons, do not alter the kinship simulation analysis of First Cousins (FC) vs. unrelated (UR), Lang’s concern about the lack of minority ethnic groups in the current Vietnamese population reference genome raises interesting questions about who gets to represent the Vietnamese, or, put more eloquently, what kinds of categories of the “Vietnamese” are reinscribed and categorized amid the political forces of DNA identification of the war dead. Who are classified and included in the official count of 300,000 Vietnam’s MIAs? Are the fallen soldiers of the Republic of Vietnam (RVN), former South Vietnam regime, included in this identification project? How may USAID funding to identify Vietnam’s MIAs contradict its original mission in Vietnam during the war period between 1962 and 1975? And, how do USAID foreign service and local Vietnamese officers reconcile this contradiction?

**USAID foreign officer navigating the political landscape of Vietnam**

As the monsoon season approached its final act for the year, the October rains followed their familiar pattern—a swift downpour to cleanse the air of Sài Gòn, followed by its quick

¹ I employ pseudonyms for all CDI researchers to protect their identities.
departure, leaving the streets to dance with the lingering raindrops and the vibrant nightlights of crowded restaurants. The heavy rain did not deter Saigonese, myself included, from going out. That night was also a special occasion as I had made plans to meet with Anthony Kolb, a Deputy Director of Reconciliation and Inclusive Development, for an interview. Originally from Wisconsin with expertise in Environmental Engineering and International Development, Tony, as his preferred name, had been stationed in the USAID Vietnam Office since 2019, and played a pivotal role in driving forward the identification project. Tall and slender with a soft-spoken voice and a kind smile, we greeted each other at Mùa Craft Sake restaurant in District 3 of Sài Gòn, an up-and-coming hotspot with innovative craft sake and Japanese tapas. Though my choice of restaurant was ill-suited for an interview, crowded with groups of inebriated businessmen, the lively atmosphere captured the essence of Saigonese culture—innovative, cosmopolitan, and vibrantly gregarious. Adept at cultural observation, at some points in the evening, Tony took a break from our interview to take in the surrounding atmosphere and remarked on the differences between Northern and Southern Vietnamese cultures, noting that Saigonese embrace enjoyment and partying with unmatched enthusiasm.

Sài Gòn also served as a significant starting point for USAID missions in its early years. Established in 1961 under the Foreign Assistance Act by the late President John F. Kennedy, South Vietnam received the largest economic assistance from USAID between 1962 and 1975, reaching up to 4.3 billion USD in 1971. Two of the key missions of USAID in South Vietnam were: (1) “to prevent a Communist conquest of Southeast Asia;” and (2) “to help Vietnam modernize its society, bolster its civil economy, develop its representative institutions, and provide a better life for its people” (A.I.D programs in Vietnam, 1967). And today, USAID is pouring millions of dollars into identifying the remains of those whom they tried to “prevent" a few decades ago. It is oversimplified to argue USAID's work as a new form of US imperialism, using Vietnam's MIAs remains as “bargaining chips" in negotiating political relations between Vietnam and US. Rather, I am concerned with the visions, intentions, and practices of USAID foreign service officers like Tony, alongside local Vietnamese officers, as they navigate the intricate landscape of Vietnamese politics to set into motion and drive forward this project.

As we began with a sake flight, Tony shared the origins of USAID funding that shaped the Vietnam identification project as well as some of the political challenges USAID faced during its implementation. USAID provides $7 million in funding to identify the remains of Vietnamese MIAs, but determining the recipients and allocation of these funds involves complex, year-long negotiations. The implementation of the funding also required approvals and supports from various government ministries and offices. The funding comes from US Senator Patrick Leahy's long-term commitment in addressing the legacies of the Vietnam War through the Leahy War Victims Fund. “[Leahy's] career began during the Vietnam War and he was really the driving force, mobilizing the entire Senate to pass the law every year, giving us money for all the work in my office, from Agent Orange-related work to what we’re doing [with] the Missing in Action now.” Leahy's interest in supporting Vietnam to identify Vietnamese MIAs only took shape in recent years as a token of gratitude towards Vietnam's assistance in recovering
American MIAs for the past 5 decades. On July 8, 2020 USAID signed a Memorandum of Intent (MOI) with the Vietnam Office for Seeking Missing Persons (VNOSMP) to cooperate on “TECHNICAL SUPPORT FOR THE IDENTIFICATION OF HUMAN REMAINS.” VNOSMP, or colloquially known as VNO, is a government office set up by Vietnam Prime Minister in 1973 after the Paris Peace Accords to cooperate with the US government, mostly the Department of Defence, on finding and locating US war remains in Vietnam.

In its 50 years of operation, VNO has collaborated with the US Defense POW/MIA Accounting Agency DPAA on over 150 search and locate missions, retrieving nearly 800 American war remains (Wagner, 2019). DPAA allocated 75% of its annual budget to Southeast Asia operations in 2013, with the requested budget for FY2023 rising to $150 million. VNO is the primary recipient of DPAA funding for missions in Vietnam. When USAID and VNO signed an MOI for technical support on Vietnam’s MIA remains, VNO was under the impression that they would be the one to manage the $7 million funding from USAID. In multiple conversations with Tony on different occasions, he repeatedly stressed the political importance of VNO in having close connections with the Ministry of Foreign Affairs (MOFA) and other government ministries, ensuring project approval from the high-level office within the Vietnamese government. However, after signing the MOI with VNO, USAID gave the award to ICMP to help develop and transfer necessary technology to Vietnam’s forensic laboratories that are specialized in identifying Vietnam’s MIAs remains. VAST, and more particularly CDI, is one of the recipients of the technology transfer and training under USAID funding. The reason USAID picked ICMP and VAST in lieu of VNO was due to the latter being particularly set up to help locate and recover American MIAs’ remains. As such, VNO’s operations weren’t directly linked to the USAID funding aimed at identifying Vietnamese MIAs. This led to confusion on the part of VNO, as Tony recalled, “When we [USAID] turned around and turned all the money to this international organization [ICMP], the VNO was like, ‘okay what’s in it for us?’ So, I think that was the general attitude and challenge early on.” Despite not being the implementing partner for USAID funding, USAID managed to find ways to include VNO in other capacities such as monitoring and assessing the progress of the scientific collaboration between VAST and ICMP. The project finally received its Official Development Assistance (ODA) in March 2024, four years after initial signing of the MOI. Tony later remarked that with most nation-states in Asia, strong governments such as Vietnam tend to be suspicious of foreign policies that may intervene in their internal affairs. As such, USAID foreign officers need to move across the cultural and political landscape of Hanoi slowly and carefully to establish trust and improve bilateral relations between the two countries.

**Setting the priority straight: Family or technology?**

Back in Hà Nội, USAID officers must not only navigate the challenging landscape of Vietnamese politics and address discrepancies in goals and directions with their implementing partner, ICMP, more particularly, on what these agencies deemed as pivotal for the success of Vietnam’s identification project. In a meeting between USAID, ICMP, and U.S. Institute of
Peace (USIP) on Vietnam War accounting initiatives in July 2023 at the BDIV Tower near the Old Quarter of Hà Nội, the Director-General of ICMP, Kathryne Bomberger, gave a brief introduction to the organization and stated necessary steps required for the success of the identification project. Kathryne, an American national, graduated from Georgetown University with degrees and expertise in International Relations and Middle Eastern Studies, was a polished diplomat, exuding curiosity, approachability, and eloquence in speeches. In the meeting, Kathryne repeatedly emphasized the importance of family reference samples collection for DNA matching and the need for a centralized database management. In Kathryne's elevator pitch about the ICMP, which she could easily recite in her sleep, ICMP is a treaty-based intergovernmental agency, with its headquarters located in the Hague, whose main mission is to help governments build legislative and investigative infrastructure in search for the missing. Kathryne emphasized the investigative aspects do not apply to the Vietnam case. Prior to moving its headquarters to the Hague, the Netherlands, the ICMP was borne out of the former Yugoslavia conflicts and located in Sarajevo, the capital of Bosnia and Herzegovina. Social anthropologists have examined the history and scientific approach of ICMP in identifying the missing (Wagner, 2008; Smith, 2017). In Wagner's (2008) work, the conception and development of DNA-led approach of ICMP was heavily dependent on the guardianship of Western governments and international organizations as an international effort to dismantle “residual socialist structures,” repair postwar damages, and assimilate Bosnia into the European Union (p. 88-89). Therefore, Wagner hints at a new form of “neoimperialism” that is deeply embedded in the organizational structures and political agendas of the ICMP. Anthropologist Lindsay Smith (2017) echoes Wagner's argument in her analysis of the ICMP and the EEAF (El Equipo Argentino de Antropología Forense), founded to assist the Grandmothers (Abuelas de Plaza de Mayo) in searching for their grandchildren in post-conflict Argentina, highlighting family members of the Disappeared as the core actors of human rights genetics at EEAF. With the rise of ICMP’s DNA-led approach, Smith argues affected members of the missing disappeared into the background and became subordinated to standardized ante-mortem questionnaire forms and swab tubes for reference samples.

In the meeting between, ICMP USAID and USIP that July afternoon, it was Kathryne, the Director-General of ICMP, who pushed for the inclusion of families in the identification project, which received pushback from a local Vietnamese USAID officer, Khoa.² Kathryne stressed the timely importance of collecting family reference sample for DNA matching analysis before living family members pass away as the war had ended almost five decades ago. To know how many family reference samples needed for kinship matching raises an important question: How many Vietnam’s MIAs are there? And, how are they counted? Tony, also present at this meeting, pointed out that the term “missing soldiers” was not desirable in Vietnamese official rhetoric. Rather, the Vietnamese government refers to them as “martyrs,” whereas in USAID’s terms, they are known as “combatants.” According to the Ministry of Labour, Invalids and Social Affairs (MOLISA), there are still 200,000 remains not located and 300,000 remains not

² While holding a high-level position within USAID Vietnam and playing a key role in many USAID War Legacies project, the officer preferred to stay anonymous. Khoa is a pseudonym to protect their identity.
identified (Hoàng Thùy, 2022). These 300,000 unidentified remains are currently buried in military cemetery in every village, town, and city across Việt Nam, whose tombstones are inscribed as “Liệt sĩ chưa xác định được thông tin” (“Martyrs not yet identified”). Sitting next to each other, the USAID Director of Reconciliation and Inclusive Office, Ritu Tariyal, quietly conveyed to Kathryne, that the soldiers being referenced were primarily from the Northern region.

“Liệt sĩ” or “martyrs” is a title reserved only for soldiers who fought and died for the Communist force in the war. Majority of these martyrs were from the North, but some were also recruited from the South. This also means South Vietnamese soldiers who fought and died for the former Republic of Vietnam (also known as former South Vietnam regime) are entirely not included in the identification project. In his study of family commemoration ritual among Vietnamese households, social anthropologist Heonik Kwon (2006) points out the “law of kinship” allows or obliges the families to commemorate the war dead regardless of their political side. Commemoration practices of the family present “important vectors in understanding the decomposition of the bipolar world order” (ibid, p. 161) in the social life of the Vietnamese. However, in the official statistics set by the Vietnamese government, the past political division between North and South Vietnam is not decomposed, but rather erased and forgotten. Even more ironic is the fact that the United States, once an ally whom South Vietnamese soldiers fought alongside, has also forsaken them and allocated funding to identify their former adversaries on the battlegrounds of the past. Khoa raised some uncertainties regarding the politics of accounting, for example, whether the martyrs who fought in Cambodia and China wars, which were also known as the Third Indochina War with its heightened years from 1978-1979, were counted. He also believed it was difficult to keep track of Communist soldiers who fought in the National Liberation Army (the Việt Cộng) in the South because they had to keep their identities confidential. Khoa, however, was certain about how "liệt sĩ" (martyrs) were recognized. The Ministry of National Defence issued the official certificate "Tổ Quốc Ghi Công" ("The Motherland Records Merit") to the families of martyrs, who then received various subsidies through MOLISA. Kathryne saw the “Tổ Quốc Ghi Công” certificate as an efficient method to trace and recruit family members of the martyrs to collect their DNA reference samples. To Kathryne, it was of utmost importance to crunch high volumes of background data such as the death certificate to understand the postwar landscape of how many unidentified remains are and how many family reference samples to be collected.

Kathryne also emphasized the need for building one centralized data repository to manage both DNA of the remains and DNA reference of the family. Vietnam currently has different institutions such as MOLISA collecting and storing family reference samples whereas forensic laboratories at the Ministry of Defence, Ministry of Health, Ministry of Public Security, and VAST all have separate data systems for storing DNA data of bone samples. This makes the kinship matching analysis difficult and fragmented. ICMP, as Kathryne explained, employed a centralized database, called iDMS: integrated Data Management System, an in-house database management system, renowned for its security and efficiency in handling extensive data related
to missing persons and their family members. This system was a significant success story in postwar Yugoslavia in storing and matching thousands of DNA data of the missing with that of the relatives. She believed Vietnam’s identification project could make great use of ICMP's iDMS.

ICMP’s suggestion of family reference sample collection and centralized data management received lots of pushback from Khoa and another local Vietnamese USAID officer. To Khoa, who had a master’s degree in engineering from Belgium and extensive experiences working on dioxin cleanup at former military airports in Vietnam, technology was the most challenging aspect of the identification project. Khoa emphasized that the Vietnamese government's primary focus was to ensure the success of ICMP’s DNA extraction technology on highly degraded bone samples. They also clarified that the government preferred not to collect family samples at this stage to avoid raising public expectations. In this regard, while ICMP focused on incorporating family reference samples into a centralized database, the Vietnamese government prioritized advancements in technology capable of extracting DNA from highly degraded bone samples. To this end, has the approach of ICMP shifted toward a more family-centered model rather than the previously suggested "mechanized, routine, and corporate-owned DNA identification" or “neoimperialism” framework as discussed by anthropologists Lindsay Smith (2017, p. 398) and Sarah Wagner (2008)?

The answer resides in how ICMP perceives the ways families could or should be involved in identification projects. In the Argentine case, Smith (2013) highlights the women-led activism of Argentine mothers and grandmothers in the early 1980s in seeking help from scientists around the world to develop genetic testing for direct kinship ties between a grandparent and a child. In the case of ICMP, families are seen more as rather passive participants whose main job was to provide DNA samples for kinship matching analysis. During an interview with the Dr. Thomas Parsons, the former Director of Forensic Science at ICMP, he outlined ICMP's achievement in establishing a centralized DNA sample database, resulting in the identification of 7,000 out of approximately 8,000 individuals missing from the Srebrenica Genocide:

“In post-conflict [former Yugoslavia], [ICMP] were given privileges and immunity within Bosnian and some adjacent countries. We were not an international organization at the time, we were just a thing, but we had substantial funding and we basically had unilateral abilities to set things up. So we set up a single centralized approach, based on reaching out to family members of the missing, developing informatic system to make a database of who’s the missing and who their families are and get genetic samples from the families. And in almost every other certain stances we encounter around the world, there are already multiple different agencies or efforts ongoing that fragment the process and complicate this strength that you get from having a single effort with a single shared database.”
In fact, Dr. Parsons recognized ICMP model as “smacked of a little colonialism” that faced resistance from various political institutions in Vietnam:

“Many places ICMP could come in and work their magic don't have a desire for some foreign entities to come and take control over the project. You know, it's smacked of a little colonialism, etc. And you probably already saw how difficult it was to get authority in Vietnam to agree to send samples out of the country. In many places that is very hard, “we're not going to send our fallen martyrs to someplace else.” Cultural, religious barriers. Also, just a lot of political territorialities going on, also. And self-interest and territoriality on the part of whatever institution it is, who wants to get the funding, who wants to be in charge, and etc. Human nature, I mean, that’s the case for the ICMP as well. We're happy to take over the role ourselves.”

Vietnam's decentralized, fragmented approach, involving multiple institutions managing family genetic reference data and bone genetic data, might signify their own form of "biosovereignty" (Ong, 2008; Petryna, 2009; Fassin, 2009; Hurlbut, 2017; Porter, 2019). On a macro level, the single centralized database approach of ICMP, a Western-founded-and-backed institution, and the “fragmented,” multi-institutional data control model of Vietnam, a market-oriented socialist state, disrupts the traditional perceptions of democratic and socialist institution systems. While ICMP advocated for an inclusion of family genetic reference samples in a centralized database system, Vietnam, most particularly Vietnamese local USAID officers and members of VAST, emphasized the need to develop feasible DNA extraction and sequencing methods suitable for highly-degraded Vietnam bone samples. By prioritizing technology, does this suggest that Vietnam overlooks the humanistic aspects of the identification project? To unpack this question, I turn to a debate among CDI forensic researchers on whether to discard bone powder of the remains after the total demineralization process.

**Lingering personhood in leftover bone powder: From bone cutting to total demineralization**

Before my initial visit to CDI, I’d imagined this would be a typical DNA laboratory, equipped with high-tech DNA sequencing machines and chemical clean rooms. What struck me most about this place wasn’t the high-tech sequencers or the advanced computer network storage. It was a scent. As I walked through the open glass door of CDI, the aroma of agarwood incense filled the air, creating a distinctive and memorable atmosphere for a DNA laboratory center. The incense scent came from a spacious corner room, 300 square feet in size and well-lit with natural sunlight that is labeled a Commemoration Room in which an altar as the centerpiece. The altar stood against the wall, adorned with a wooden frame etched in gold featuring a Communist symbol—a star reminiscent of the golden star on Vietnam national flag—and the familiar slogan known to every Vietnamese born and raised in Vietnam: "Tổ Quốc Ghi Công," translating to "The Fatherland acknowledges [your] sacrifice." Against the wooden frame
lay three dark-brown console tables with the middle one taller than the other two. On the middle table lay a two-feet tall golden statue of Siddhārtha Gautama Buddha as the centerpiece. Incense holders, candles, lotus flowers, choco pies, wafers, travel size vodka bottles are offerings that make sure Buddha is always well-fed and appreciated. The CDI director once shared with me that the Buddha statue had been blessed with chanting and prayers from a well-known Buddhist monk. Despite being an atheist, the director made sure he or his staff would light an incense every day for Buddha and have the flowers watered or changed regularly. It is not very often that one would find a Commemoration Room in a scientific center.

To the left of the Commemoration Room at the far end of the first floor are the Sample Storage Room, Bone Processing Room, and PCR Room, followed by several specialized rooms including the Electrophoresis Area. Near the entrance, on the left side, are the local ICMP Vietnam office, and the Lunch Room for CDI staff, while the Guest Reception Room and the Meeting Room are positioned on the right side of the corridor. The second floor of CDI is divided into distinct sections: one side houses pristine laboratory spaces, while the other hosts director and staff offices along with a server room, separated by a central hallway. Among the specialized rooms are the Chemical Preparation Area, Bone Preparation Area, and DNA Low Copy Extraction Room. The workflow starts on the first floor with the bone processing step, continued with the grinding and extraction steps on the second floor, and returned to the first floor for final quantification and PCR processes. On a chilly late winter morning, I shadowed three CDI researchers, Huy, Hùng, and Hân, in their bone cleaning and cutting processes in the bone processing room. During my observation time at CDI, the tasks of cleaning and grinding the bone specimens were usually performed for the male researchers, even though all CDI researchers are well trained to carry out all the steps. Dr. Thomas Parsons was also present to observe the process. Prior to accessing the workstation, all technicians and observers were mandated to don personal protective equipment, comprising a full-body lab coat, hairnet, mask, and gloves. This precautionary measure aimed to prevent both sample contamination and the transfer of contaminants to individuals.

During our observation, the team prepared to work on fifteen bone samples. They meticulously sealed each sample, including teeth, tibia, and femur, in individual plastic ziplock bags. Huy, serving as the lead technician, conducted bone cleaning, cutting, and sanding, while Hùng, the assistant, managed sample photography, weighing, and record-keeping. Huy's workstation, resembling a kitchen sink, featured a makeshift styrofoam hood, a ruler attached to a water tube for straight water flow, a toothbrush soaked in bleach for tool cleaning, and two electric-powered cutting tools. Hoang's workstation, adjacent to Huy's, included a brown desk where the samples were arranged in ziplock bags. Carefully selecting a bone specimen, typically weighing 20 grams, from the photo station, Huy transferred it to a petri dish between workstations. Utilizing precision and expertise, Huy cut the bone with electric-powered tools to obtain suitable fragments, then sanded them to expose the inner core free of dirt or bacteria. In hard-to-reach areas, Huy used an electric needle drill akin to a dental drill to remove any attached dirt. The desired sample weights for downstream extraction, depending on the
extraction method, ranged from 1.3 to 2 grams. During the observation, no one had prepared me for the intense smell that emanated from the bones as the electric blade sliced through them. Dr. Parsons, who was also observing the process with me, described the smell as burnt protein, similar to the smell of burnt hair. However, to me, the charred odor was secondary to a more dominant essence of dewiness or dampness, reminiscent of wet clothes left unwashed for days. Many of these fallen soldiers had been buried under the humid and wet soil of tropical forests for decades. The smell lingered in my nose and at the back of my throat for days afterward.

The next steps included cleaning the samples with bleach and drying the bone specimens overnight in the Bone Preparation Area on the second floor. The following morning, Hùng took the lead in grinding the bone specimens into powder under the smashing power of a stainless-steel grinding ball. During the grinding process, Hùng placed bone fragments in a DNA-free grinding jar under the stainless-steel grinding ball. Hoang set and secured the grinding jars in the two clamps at the front of a TissueLyser machine, then turned on the power to start the shaking horizontally. The stainless-steel ball grinded, smashed, and beat the bone into powder. Every 5 to 10 seconds, Hùng paused the shaking, removed the jar from the clamps, and pounded it on the table to check for the sound of the ball moving to ensure the bone did not get stuck by the side of the ball. This oscillation continued at high speed for 5-8 minutes, with periodic pauses to ensure the bone positioned under the grinding ball. The final product was finely ground bone powder. The researchers then transferred the bone powder in laboratory tubes to the Low Copy DNA Extraction Room to carry out the total demineralization and DNA extraction processes.

Depending on the extraction method, the team used 0.2 to 1 gram of bone powder for demineralization. Huy led the technical work for the day, while Minh, another CDI researcher with a Master's degree in Biotechnology, served as a live witness to assist and verify each step of the extraction process. For the demineralization process, Huy added a demineralization buffer and Proteinase K into each sample tube using automatic pipet. Demineralization buffer included EDTA, some sort of soap or detergent, to break down proteins and other cellular components as well as removed heavy metal ions such as magnesium or calcium to release and stabilize DNA. This process completely breaks down the cellular materials and mineral structures, releasing all the DNA from the bones into a clear solution, called lysate. After an overnight incubation at 56 degrees Celsius, some pellet or powder remnants were left at the bottom of the tube. This leftover powder sparked debates among the researchers about whether to keep or discard them.

Some senior staff, including the director, advocated for preserving the bone powder due to its association with "tâm linh," often translated as "spirituality," a phrased frequently evoked by scientists and non-scientists stakeholders involved in this DNA identification project. On the other hand, younger staffers proposed discarding leftover bone powder, citing the expenditure of time and energy required for sample preservation and expressing concerns about potential sample mix-ups. Moreover, they also noted ICMP scientists in the Hague discarded leftover bone powders in their protocol. A senior scientist aligned with the younger perspective, arguing that after the total demineralization, DNA was completely extracted or digested from the remaining bone powder, the sample lost any individuality or personhood of the war dead. The younger
staffers proposed an annual ritual or ceremony to honor the spirit of “các cụ” (loosely translated as “the war dead”) and to justify discarding the leftover powder. However, the director insisted on not discarding any bone powder of the war dead, particularly not disposing of it in the trash. He reminded everyone that, beyond scientific procedures, they must also uphold the "nhân văn", humanity, of the Vietnamese. The director stressed that CDI staff should not blindly adhere to ICMP protocols, especially when it came to discarding leftover bone powder. While handling the remains, CDI staffers must maintain their own Vietnamese "bản sắc" or essence.

Conclusion

2023 was a busy year for Hà Nội as it welcomed two of the most powerful world leaders: President Biden of the United States in September and President Xi Jinping of the People's Republic of China in December. As the political tension between US and China heightened over the years, Vietnam has progressively emerged as a pivotal ally due to its strategic geopolitical position and rapidly expanding economic influence in the Asia Pacific area. After Biden’s visit, the White House issued a Fact Sheet highlighted the US commitment to aiding Vietnam in establishing "a technology-driven system for identifying remains from the war." Scholars have examined how the remains of fallen U.S. service members are often cast as “bargaining chips” in negotiations between the United States and Vietnamese governments in the early decades after the end of the war. On a broader level, this paper has suggested how the USAID funding on DNA technology development to identify remains of Vietnam's MIAs are parts of broader geopolitical maneuvers contributed to Vietnam-US comprehensive strategic partnership amid the global tensions between the US and China. The paper has also unpacked the agency of Vietnamese researchers in insisting on developing SNP-based technology, instead of STR analysis, to increase the power of identification for Vietnamese bone samples. This allows for a two-way knowledge exchange, rather than simply a one-way technology transfer, in the cooperation with ICMP and their Vietnam scientific partners. The paper also delved into the single centralized database approach of ICMP, an Western-founded-and-backed institution, and the “fragmented,” multi-institutional data control model of Vietnam, a market-oriented socialist state, challenging the traditional perceptions of democratic and socialist institution systems. The questions remain: Can a technology-driven system fully address the legacy of violence inflicted during the Vietnam-American war? Or can the violence truly be repaired, but only be symbolically identified through DNA?

During the course of my fieldwork in Vietnam, I often heard Vietnamese scientists, family members of the war dead, and local ICMP and USAID staff evoked the phrase, “tâm linh,” loosely translated as spirituality, to describe their efforts in searching and identifying the remains of the war dead. To a DNA researcher who later joined CDI as the new Deputy Director, “tâm linh” is an integral part of their scientific identification work whose main aim is to repay gratitude for the sacrifice of the fallen soldiers for the country’s independence. The decorative altar in the Commemoration Room at CDI demonstrates the embeddness of “tâm linh” is deeply in the scientific identification work in Vietnam. The debate on whether to discard the leftover
bone powder after the total demineralization process reflects a deeper discussion regarding the relationship between DNA, personhood and spirituality. Some Vietnamese researchers believed that the personhood or spirit of the war dead ceases to exist when their DNA is fully digested. Some reckoned the personhood extended beyond the materiality of DNA. The power of identification in the Vietnam project lies not only in the advancement of technology, but also in a balancing act between the violent and destructive processes of cutting and grinding bones into powder for DNA extraction and maintaining respect for the “personhood” of the war dead and uphold the essence of the Vietnamese culture.
Works Cited