Sacramento Archeological Society, Inc.
Newsletter

www.sacarcheology.org. May/June - **2025**

UPCOMING EVENTS CALENDAR

Please note the webinars for the next two months will be via Zoom. The June presentations will also be in person at Pena Archaeology Facility (607 Pena Dr. Suite 600; Davis, CA) and via Zoom. We encourage in-person attendance when possible. All Webinars will be held Saturday afternoons starting at 2:00 PM PT. Note the events being scheduled for July and August.

May 2025

May 10, 2025 - Saturday, 11:00 AM PT – 12:30 PM Zoom **Board Meeting**

May 10, 2025 – Saturday 2:00 – 3:30 PM PT - **SAS Webinar** UCD Scholar presentation: **Katlin Jones** –"The Clear Lake Archaeology Project – Kelsey Creek Schoolhouse", CA State University Sacramento; **Brandon Yam** – Crow Canyon Field School, Hampton College

May 22 – 27, 2015 – ARARA Conference, Visalia, CA (For more information go to: https://arara.wildapricot.org/Conference-Info-2025.)

June 2025

June 14, 2025 – Saturday 11:00 AM PT – 12:30 PM Zoom **SAS Board Meeting**

June 14, 2025 - Saturday 2:00 – 3:30 PM PT - **SAS Webinar**, **Tara Johnson,** "Artifactor Scanning System", at Pena Archaeology Facility (607 Pena Dr. Suite 600; Davis, CA) and via Zoom

July 2025

July 12, 2025 – Saturday 11:30 – 1:30 PM PT - **SAS Board Meeting**

July 26, 2025 - Saturday 1:00 – 6:00 PM PT Seventh Annual SAS Pool-Party/Pot-Luck/Social **Dan and Victoria Foster's** home

August 2025

August 16, 2025 - Saturday 11:00 – 4:00 PM PT - **"A Workshop on Identifying Fluted Points"** Given by **Mike Rondeau**, archaeologist, at Pena Archaeology Facility (607 Pena Dr. Suite 600; Davis, CA)

See announcements: https://sacarcheology.org/announcements/ for **webinar access information** and calendar: https://sacarcheology.org/archaeology-activities/calendar-of-events/ for the complete set of events in our website: www.sacarcheology.org.
For all SAS Webinars friends are welcome and also invited to join our organization. There is no participation fee.

UPCOMING EVENTS

SAS Webinar

"The Clearlake Archaeology Project: Kelsey Creek Schoolhouse"

by

Katilin Jones, Sacramento State University

and

"Crow Canyon Field School - Haynie Site"

by

Brandon Yam, Hampton College

Saturday May10, 2025

2:00 PM – 4:00 PM PT

Katilin Jones is a senior at California State University, Sacramento, California. She received a scholarship in 2023 to attend a field school in 2024. She attended The Clearlake Archaeology Project: Kelsey Creek Schoolhouse field school. This school house is the last standing one-room school house in the county. The field school was offered by Foothill College's Department of Anthropology. Katilin will relay the remarkable history of the Clear Lake region as gleaned through her experience at the field school.

Brandon Yam is a senior at Hamilton College, Clinton, NY. He received a scholarship in 2024 to attend the Crow Canyon Archaeological Center's College Field School. The field school focused on excavation at the Haynie site, a Chaco Outlier. Brandon wanted to identify human-environmental relationships from his experience excavating at the Haynie site. He is basing his senior thesis on this topic. In this talk he will share his experience and insight from one of the key Southwest sites from the Ancestral Pueblo period.

The seminar will start at 2:00 pm PT and formally conclude at 4:00 pm. You may join starting at 1:45 pm to say "Hello" and enjoy a social time.

Friends are welcome and also invited to join our organization. There is no participation fee.

SAS Webinar

Saturday, June 14, 2025

2:00 – 3:30 PM PT

““Artifactor Scanning System”

By

Tara Johnson

at

Pena Archaeology Facility (607 Pena Dr. Suite 600; Davis, CA) and via Zoom

A simple, convenient, fast, and durable system for unidirectionally scanning three-dimensional objects has many applications in archaeological fieldwork and cataloging collections. Please join us for a demonstration of the Artifactor Scan System, a fossil and artifact scanning platform created by Tara Johnson and manufactured at Maker Nexus in Sunnyvale, CA. Using the Widar software (subscription required), scans take approximately 3-5 minutes to collect and 15-20 minutes to process. Please feel free to bring your iPhone and a non-fragile artifact, roughly 1 cubic foot in size, to try scanning for yourself. The Artifactor Scan System is still a prototype, with new types of clamping supports under active development, so feedback on possible new use cases would be greatly appreciated.

Tara Johnson is a junior at Irvington High School in Fremont, CA. She has eight years of experience applying computer modeling, programming, and rapid prototyping technologies in the digital humanities. She is the creator of the Artifactor scanning system, which was prototyped at Maker Nexus and is being tested in collaboration with the Children's Natural History of Fremont. She is also a contributor to Pyhiero, a Python-based computational linguistics processor that translates *Manual de Codage* (MdC) notation to Unicode Egyptian hieroglyphs.

PAST EVENTS

SAS Webinar ““Stable Isotope Analysis, Radiocarbon Dating and Paleoproteomics of Human Teeth from El-Hesa, Egypt”

On March 8, 2025 via Zoom Brooks Morey, graduate student at Indiana University, Bloomington gave a presentation on her research of individuals buried in a cemetery at El-Hesa, Egypt. She analyzed teeth from 10 El-Hesa burials in order to gather information on who the people were, when they lived, and possibly what was the community's social structure, economic and religious life at that time. She used three analytical methods: Carbon 14 dating, paleoproteomics to identify biological sex, and health markers, and isotopic analysis to perceive diet and mobility. The Carbon 14 dating is pending. The anticipated date of the burials is 5th century CE. The paleoproteomic analysis clarified the sex of the individuals. Four of them were incorrectly typed. One individual was particularly interesting because he probably had

schizophrenia and had susceptibility to autism. The isotope analysis suggested that individuals from El-Hesa had a high animal protein diet that included C3 plants and fresh water fish.

SAS Webinar – Scholar Presentations

On Saturday, April 12 SAS members and friends heard presentations from two PhD students who were awarded scholarships to support their research.

Diana Malarchik, a PhD student at University of California Davis updated us on her research of human skeletal teeth buried in San Francisco Cemeteries (Golden Gate City, Yerba Bueno and the Big Four (Calvary, Laurel Hill, Masonic and Odd Fellows)) and Santa Clara Medical Center Cemetery. She addressed the use of proteomics to identify sex and isotopes to suggest diet especially for infants. Also she analyzed enamel to identified ingestion of heavy metals such as mercury, arsenic and lead. She found that the historic period in San Francisco reflected a significant increase (200% over pre contact 2% and California Mission 4% periods) of the consumption of these heavy medals.

Jessica Morales PhD student at University of California Davis updated us on her dissertation research regarding the potential use of dogs for hunting in pre-contact California. Using isotope analysis of teeth she identified that pre-contact dog diet was variable. Hunting dogs probably ate more meat. Other dogs didn't. She also discussed a project to reconstruct a faunal paleoecology map using sulfur as a variable. This study was to answer the question: How far would hunters travel to secure big game?

MEMBER'S CORNER

Memberships

We thank everyone who has renewed your membership and welcome Jeb Burton as a new member.

Major Donors

We are pleased to acknowledge our major contributors for 2024/2025. These donations support our scholarship program.

Patron ($1000 or more, listed in alphabetical order)
Paul K. Davis and Knuti VanHoven
Dennis Fenwick and Martha Lewis
Ruth McElhinney
Carolyn and Gordon McGregor
Sponsor ($100 - $999)
OSISoft a division of AVEVA
Lynette Blumhardt
Larry Boerio
Jean Coy

George W. Foxworth
Jan and Tom Johansen
Jeremy Johansen
Tori Lyon
Roger and Lydia Peake
Teresa Steele

Annual Memberships

All memberships are renewable on **January 1** annually except for those who joined recently (after September 1 of the previous year). Please support the society by promptly paying your **2025** dues. Remember your dues help make **scholarships** possible. We keep overhead low so that the funds can be used to support students. You may now use our web site https://sacarcheology.org/society-membership/pay-dues/ to renew and make payment using a credit card or Paypal. Remember a membership benefit is email receipt of archaeological/anthropological articles and notices of related events.

The annual dues are:	
Student/Limited Member	$15
Individual Membership	$30
Family Membership	$40
Sponsor	$100 - 999 (individual)
	$500 - 999 (business)
Patron	$1000

Alternatively, please make out your check to "**Sacramento Archeological Society, Inc**." and mail it to:

Sacramento Archeological Society, Inc.
P.O. Box 163287
Sacramento, CA 95816-9287
We really appreciate your support.

****

Annual Dues for 2025

Name(s):_____ Email: _____ **Phone:** _____

_____ Email: _____ **Phone:** _____

Address:

_____

_____

Student/Limited Member	$15	____	$_____
Individual Membership	$30	____	$_____
Family Membership	$40	____	$_____
Sponsor	$100	____	$_____
Scholarship Donation			$_____

Total enclosed $_____

ARCHAEOLOGICAL REFERENCES

Recent Articles

The reviewed article(s) chronologically presented (oldest subject first) are:

- "Systematic bone tool production at 1.5 million years ago"
- "Australopithecus at Sterkfontein did not consume substantial mammalian meat"
- "Face to face with the first known Western European"
- "A male Denisovan mandible from Pleistocene Taiwan"
- "Humans in Africa's wet tropical forest 150 thousand years ago"
- "Earliest modern human genomes constrain timing of Neanderthal admixture"
- "Ancient DNA illuminates 'green Sahara' dwellers"
- "A genomic history of the North Pontic Region from the Neolithic to the Bronze Age"
- "The genetic origin of the Indo-Europeans"
- "Continental influx and pervasive matrilocality in Iron Age Britain"
- "Ancient DNA reveals reproductive barrier despite shared Avar-period culture"
- "Maize monoculture supported pre-Columbian urbanism in southwestern Amazonia"
- "Facing the past – Researchers and Indigenous Amazon nation team up to study charged ritual objects: shrunken heads"

"Systematic bone tool production at 1.5 million years ago"

"Recent evidence indicates that the emergence of stone tool technology occurred before the appearance of the genus *Homo* and may potentially be traced back deep into the primate evolutionary line. Conversely, osseous technologies are apparently exclusive of later hominins from approximately 2 million years ago (Ma), whereas the earliest systematic production of bone tools is currently restricted to European Acheulean sites 400-250 thousand years ago. Researchers here document an assemblage of bone tools shaped by knapping found within a single stratigraphic horizon at Olduvai Gorge dated to 1.5 Ma. Large mammal limb bone fragments, mostly from hippopotamus and elephant, were shaped to produce various tools,

including massive elongated implements. Before the discovery, bone artifact production pre-Middle Stone Age African contexts was widely considered as episodic, expedient and unrepresentative of early *Homo* toolkits. However, their results demonstrate that at the transition between the Oldowan and the early Acheulean, East African hominins developed an original cultural innovation that entailed a transfer and adaption of knapping skills from stone to bone. By producing technologically and morphologically standardized bone tools, early Acheulean toolmakers unraveled technological repertoires that were previously thought to have appeared routinely more than 1 million years later." (Ignacio de la Torre *et al*., *Nature*, V640, 2025-04-3 pp. 130-134)

"Australopithecus at Sterkfontein did not consume substantial mammalian meat"

"Incorporation of animal-based foods into early hominin diets has been hypothesized to be a major catalyst of many important evolutionary events, including brain expansion. However, direct evidence of the onset of and evolution of animal resource consumption in hominins remains elusive. The nitrogen-15 to nitrogen-14 ratio in collagen provides tropic information about individuals in modern and geologically recent ecosystems (<200,000 years ago), but diagenetic loss of this organic matter precludes studies of greater age. By contrast, nitrogen in tooth enamel is preserved for millions of years. The researchers report enamel-bound organic nitrogen and carbonate carbon isotope measurement of Sterkfontein Member 4 mammalian fauna, including seven Australopithecus specimens. Their results suggest a variable to plant-based diet (largely C_3) for these hominins. Therefore, they argue that Australopithecus at Sterkfontein did not engage in regular mammalian meat consumption." (Tina Lüdecke *et al*., *Science*, V387, 2025-01-17 pp. 309-314)

"Face to face with the first known Western European

At least 1.1 million years old, a fossil face suggests more than one type of early human inhabited Europe"

"In 2022 archaeology graduate student Edgar Téllez found a mud-covered facial bone with tooth roots intact at Atapuerca cave in northern Spain. After cleaning and examining the fossil, the team of researchers determined that the fossil represents the earliest human face of Western Europe. The find confirms that a wide-ranging human ancestor, *Homo erectus*, whose remains are scattered across Africa and Asia, made it to Western Europe as well. The date of 1.1 million to 1.4 million years old is based on the known age for the combination of thousands of animal fossils found in the same layer of the cave. In the same layer, researchers found the bone of a small mammal with cut marks showing it had been defleshed with stone tools. Paleo anthropologist Maria Martinón-Torres thinks *H. erectus* or its close relative came first, but left Atapuerca or died out during a frigid period when glaciers advanced over Europe, about 900,000 years ago. Then, *H. antecessor* may have come from a source population in Eastern

Europe or Africa, and spread to Western Europe." (Ann Gibbons, *Science*, V387, 2025-03-14 p. 1137)

"A male Denisovan mandible from Pleistocene Taiwan"

"Denisovans are an extinct hominin group defined by ancient genomes of Middle to Late Pleistocene fossils from southern Siberia. Although genomic evidence suggests their widespread distribution throughout eastern Asia and possible Oceania, so far only a few fossils from the Altai and Tibet are confidently identified molecularly as Denisovan. The researchers identified a hominin mandible (Penghu 1) from Taiwan (10,000 to 70,000 years ago or 130,000 to 190,000 years ago) as belonging to a male Denisovan by applying ancient protein analysis. They retrieved 4241 amino acid residues and identified two Denisovan-specific variants. The increased fossil sample of Denisovans demonstrates their wider distribution, including warm and humid regions, as well as their shared distinct robust dentognathic traits that markedly contrast with their sister group, Neanderthals." (Takumi Tsutaya *et al*., *Science*, V388, 2025-04-11 pp. 176-179)

"Humans in Africa's wet tropical forests 150 thousand years ago"

"Humans emerged across Africa shortly before 300 thousand years ago (ka). Although this pan-African evolutionary process implicates diverse environment in the human story, the role of tropical forests remains poorly understood. Here researchers report a clear association between late idle Pleistocene material culture and a wet tropical forest in southern Côte d'Ivore, a region of present-day rainforest. Twinned optically stimulated luminescence and electron spin resonance dating methods constrain the onset of human occupations at Bété I to around 150 ka, linking them with *Homo sapiens*. Plant wax biomarker, stable isotope, phytolith and pollen analyses of associated sediments all point to a wet forest environment. The results represent the oldest year known clear association between humans and this habitat type. The secure attribution of stone tool assemblages with the wet forest environment demonstrates that Africa's forests were not a major ecological barrier for *H. sapiens* as early as around 150 ka." (Eslem Ben Arous *et al*., *Nature*, V640, 2025-04-10 pp. 402-407)

"Earliest modern human genomes constrain timing of Neanderthal admixture"

"Modern humans arrived in Europe more than 45,000 years ago, overlapping at least 5,000 years with Neanderthals. Limited genomic data from these early modern humans have shown that a least two genetically distinct groups inhabited Europe, represented by Zlatý kůň, Czechia and Bacho Kiro, Bulgaria. The researchers deepen understanding of early modern humans by analyzing one high-coverage genome and five low-coverage genomes from approximately 45,000-year-old remains from Ilsenhöhle in Ranis, Germany, and a further high-coverage genome from Zlatý kůň individuals and that they were part of the same small, isolated

population that represents the deepest known split from the Out-of-Africa lineage. Ranis genomes harbor Neanderthal segments that originate from a single admixture event shared with all non-Africans sequenced so far resided in a common population at this time, and further suggests that modern human remains older than 50,000 years from outside Africa represent different non-African populations." (Arev P Sümer *et al*., *Nature*, V625, 2025-02-20 pp. 711-717)

"Neanderthal ancestry through time: Insights from genomes of ancient and present-day humans"

"Today, the Sahara Desert is a sea of sand, but 7000 years ago it was a lush savanna full of hippos, crocodiles, elephants, and giraffes. A team of geneticist and archaeologist has now gleaning genetic data from early Saharans: two women buried in a cave in southern Libya. Between 2003 and 2006 a team of archaeologist excavated a rock shelter called Takarkori in southwestern Libya near the Algerian border. The site yielded pottery sherds impregnated with milk fats, the oldest evidence of dairying in Africa and some of the first signs of wild cereal domestication on the continent. Nearby caves are richly decorated with rock art depicting hunting and herding scenes. It also concealed the remains of 15 women and children who were buried between 8000 and 400 years ago. Two of them—both women in their 40s—died around 5000 BCE after shifting climate patterns ended the Sahara's green period. Their bodies were naturally mummified by the dry desert conditions and contained enough preserved DNA for researchers to reconstruct their genomes and compare their ancestry with databases of modern and ancient populations.

The DNA suggests their ancestors were distinct from sub-Saharan African. The genomes of the people from that region contain DNA derived from Neanderthals, acquired when modern humans began to move out of Africa and swap genes with close cousins, some 50,000 to 60,000 years ago. But the genome of the woman with the best preserved DNA had only a vanishingly small amount of Neanderthal ancestry, 10 times less than people living outside sub-Saharan Africa today. Meanwhile, the women's mitochondrial DNA, which is passed down along the maternal line, suggested their ancestors came from an African population that provided some of the earliest modern human migrants to Europe. That population has now vanished from both continents. Although the ancestry of these women offers a good start to the story of those who occupied this fleeting green Sahara, much more work is needed." (Andrew Curry, *Science*, V388, 2025-04-04 p. 18)

"A genomic history of the North Pontic Region from the Neolithic to the Bronze Age"

"The North Pontic Region was the meeting point of the farmers of Old Europe and the foragers and pastoralist of the Eurasian steep, and the source of migrations deep into Europe. In this article the researchers report genome-wide data from 81 prehistoric North Pontic individuals to understand the genetic makeup of its people. North Pontic foragers had ancestry from Balkan and Eastern hunter-gatherers as well as European farmers and, occasionally, Caucasus hunter-

gatherers. During the Eneolithic period, a wave of migrants from the Caucasus-Lower Volga area bypassed the local forages to mix in equal parts with Trypillian farmers, forming the people of the Usatove culture around 4500 BCE. A temporally overlapping wave of migrants from the Caucasus-Lower Volga blended with foragers instead of farmers to form Serednii Stih people. The third wave was the Yamna—descendants of the Serednii Stih who formed by mixture around 4000 BCE and expanded during the Early Bronze Age (3300 BCE). The temporal gap between Serednii Stih and the Yamna is bridged by a genetically Yamna individual from Mykhailivka, Ukraine (3635 – 3383), a site of archaeological continuity across the Eneolithic-Bronze Age transition and a likely epicenter of Yamna formation. Each of these three waves of migration propagated distinctive ancestries while also incorporating outsiders, a flexible strategy that may explain the success of the peoples of the North Pontic in spreading their genes and culture across Eurasia." (Alexey G. Nikitin *et al*., *Nature*, V639, 2025-03-6 pp. 124-131)

"The genetic origin of the Indo-Europeans"

"The Yamnaya archaeological complex appeared around 3300 BC across the steppes north of the Black and Caspian Seas and by 3000 BCE it reached its maximal extent, ranging from Hungary in the west to Kazakhstan in the east. To localize Yamnaya origins among the preceding Eneolithic people, the researchers assembled ancient DNA from 435 individuals, demonstrating three genetic clines. A Causcasus-lower Volga (CLV) cline suffused with Caucasus hunter-gatherer ancestry extending between a Caucasus Neolithic southern end and a northern end at Berezhnovka along the lower Volga River. Bidirectional gene flow created intermediate populations, such as the north Caucasus Maikop people, and those at Remontnoye on the steppe. The Volga cline was formed as CLV people mixed with upriver populations of Eastern hunter-gatherers ancestry, creating hypervariable groups, including one at Khvalysk. The Dnipro cline was formed with CLV people moved west, mixing with people in Ukraine Neolithic hunter-gatherers ancestry along the Dnipro and Don rivers to establish Serednii Stih groups, from who Yamnaya ancestors formed around 4000 BC and grew rapidly after 3750-3350 BC. The CLV people contributed around four-fifths of the ancestry of the Yamnaya and entering Anatolia, probably from the east, at least one-tenth of the ancestry of Bronze Age central Anatolians, who spoke Hittite. The researchers propose that the final unity of the speakers of 'proto-Indo-Anatolian', the language ancestral to both Anatolian and Indo-European people, occurred in CLV people sometime between 4400 BC and 4000 BC." (Iosif Lazaridis *et al*., *Nature*, V639, 2025-03-6 pp. 132-142)

"Continental influx and pervasive matrilocality in Iron Age Britain"

"Roman writers found the relative empowerment of Celtic women remarkable. The Late Iron Age Durotiges tribe, who occupied the central southern English coast around 100 BCE to 100 CE, often buried women with substantial grave goods. The researchers analyzed 57 ancient genomes from Durotrigian burial sites and found an extended kin group centered round a single maternal lineage, with unrelated (presumably inward migrating) burials being predominantly

male. Matrilocality, whereby partners predominantly reside with or near the wife's parents, is relatively rare in modern ethnographic databases, whereas patrilocality is by far the most common system." (Lara M. Cassidy *et al*., *Nature*, V637, 2025-01-30 pp. 1136-1142)

"Ancient DNA reveals reproductive barrier despite shared Avar-period culture"

"In 552 CE the Turks destroyed the Empire of the Avars (called 'Rouran' in Chinese texts) in present-day Mongolia, and numerous Avars and other steppe riders migrated to Europe and settled in the Carpathian Basin (mainly modern Hungary in 567-568 CE). According to written accounts, they dominated an ethnically and culturally heterogeneous population including Bulgars, Gepids, Slavs and Roman, and repeatedly raided East Roman provinces in the Balkan Peninsula, culminating in a failed siege of Constantinople in 626. Their realm in Eastern Central Europe continued in a more peaceful fashion until Frankish armies destroyed it in roughly 800 CE. A rich archaeological record from almost 100,000 graves shows how the cultural diversity of the early Avar period gave way to the homogenous culture of the eighth century. Allestations of ethic multiplicity disappear and the texts only mention Avars in their realm. In this study, the researchers address a peripheral region of the Avar Empire, the Vienna Basin in eastern Austria, in the later period of Avar rule (roughly 650-800 CE). They used ancient genome-wide data of 722 individuals and reconstructed six-generation pedigrees at both sites including up to 450 closely related individuals. They found that after 200 years the ancestry at one site (Leoberdorf) remained dominantly East Asian-like, whereas the other site (Mödling) shows local, European-like ancestry. A generation-long genetic barrier was maintained by systematically choosing partners with similar ancestry from the other sites in the Avar realm. Leoberdorf had more biological connections with Avar heartlands than with Mödling, which is instead linked to another site from the Vienna Basin with European-like ancestry. Mobility between sites was mostly due to female exogamy pointing to different marriages networks as the main driver for the maintenance of the genetic barrier. " (Ke Wang *et al*., *Nature*, V638, 2025-02-27 pp. 1007-1014)

"Maize monoculture supported pre-Columbian urbanism in southwestern Amazonia"

"The Casarabe culture (500-1400 CE), spreading over roughly 4,500 km² over the monumental mounds region of the Llanos de Moxos, Bolivia, is one of the clearest examples of urbanism in pre-Columbian (pre-1492 CE) Amazonia. It exhibits a four-tier hierarchical settlement pattern, with hundreds of monumental mounds interconnected by canals and causeways. Despite archaeological evidence indicating that maize was cultivated by this society, it is unknown whether it was the staple crop and which type of agricultural farming system was used to support this urban-scale society. In this article, the researchers address this issue by integration of remote sensing, field survey and microbotanical analyses, which shows that the Casarabe culture invested heavily in landscape engineering, constructing a complex system of drainage canals (to drain excess water during the rainy season). Phlytolith analyses of 178 samples from

18 soil profiles in drained fields, farm ponds and forested settings record the singular and ubiquitous presence of maize (Zea mays) in pre-Columbian fields and farm ponds, and an absence of evidence for agricultural practices in the forest. Collectively, their finds show how the Casarabe culture managed the savannah landscape for intensive year-round maize monoculture that probably sustained its relatively large population. " (Umberto Lombardo *et al*., *Nature*, V639, 2025-03-6 pp. 119-123)

"Facing the Past

Researchers and Indigenous Amazon nation team up to study charged ritual objects: shrunken heads"

"Until the 20th century, Indigenous Shuar people in the Amazon rainforest created tsantsas (shrunken head). These were often from the heads of enemies killed in battle. Few of the heads remain with the Shuar. Hundreds of tsantsas sit in museums and private homes worldwide. A Tsantsas Project has been established to bring tsantsas home. Because they are cultural objects and human remains more than 100 years old, most tsantsas legally belong to the government of Ecuador, rather than to the Shuar. In addition, many tsantsas were created from the remains of members of the Indigenous Achuar nation, who sometimes fought with the Shuar in the past. The Achuar are not requesting the objects for repatriation. The Shuar are adamant that the heads are theirs. With small grants a team studied 26 tsantsas from three Ecuadorian museums, the Pitt Rivers Museum and a private collection. The Guayaquil Municipal Museum in Ecuador is the project's newest partner with five tsantsas.

Shuar traditions suggest their ancestors created ritual tsantsas from the remains of humans, sloths, and monkeys for hundreds of years: European noted the practice when they arrived in 1500s. The Shuar were then seminomadic, hunting and gathering mainly along the Pastaza, Morona, Santiago, and Zamora rivers in the rainforest of today's Ecuador and Peru. For centuries the Shuar have largely resisted colonization, first by the Inca, then by the Spanish. But their way of life became westernized around 1900. Today most live in permanent settlements where they farm, make handicrafts, and work in forestry conservation and the oil and mining industries.

Stories of Shuar ancestors state that tsantsas were made as a part of a ritual to give good energy (or power) to leaders or during battles with other communities such as the Achuar. The winner would take the head of the opposing leader. The goal was not just to harness a fallen warrior's energy and leadership knowledge, but also to "give thanks to the god Arutam… as a tribute in gratitude to the Earth, Sun and rain"." (Kata Karáth., *Science*, V387, 2025-2-28 pp. 919-923)

Sacramento Archeological Society, Inc.
P.O. Box 163287
Sacramento, CA 95816-9287