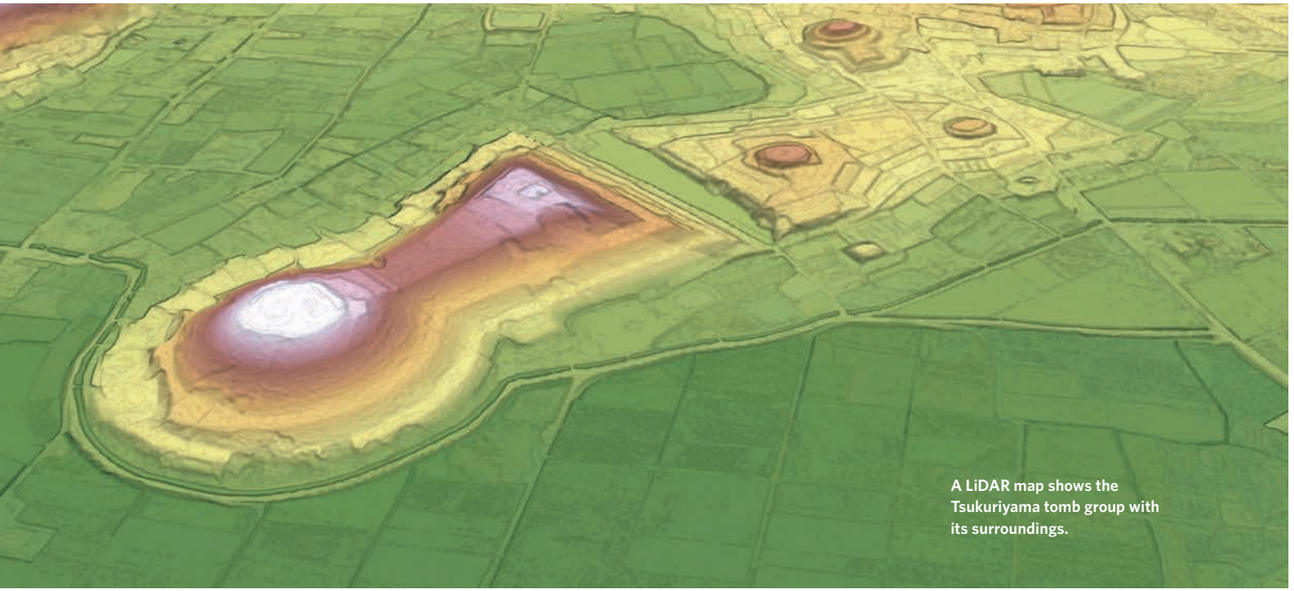

A LiDAR map shows the Tsukuriyama tomb group with its surroundings.

DEEPENING UNDERSTANDING OF HUMAN CIVILIZATION

Researchers in Japan are adopting A NOVEL MULTI-DISCIPLINARY APPROACH to uncover lessons from the past in both Asia and Mesoamerica.

The development of civilization brought a new standard of living to human societies, but it also brought problems such as warfare, environmental degradation and disparity of wealth. Looking at the bigger picture of the history of humanity, rather than the causes of these issues individually, can provide a fresh perspective on these global challenges.

The Research Institute for the Dynamics of civilizations (RIDC) Okayama University in Japan aims to establish a framework for interdisciplinary research that marries the humanities, social sciences and natural sciences.

Director of the institute and leader of the 'Out of Eurasia' project, Naoko Matsumoto, says that researchers are trying to understand the unique aspects of our species that gave rise to civilization through collaboration between many fields, including neuroscience, psychology, molecular anthropology, and cultural anthropology.

OUT OF EURASIA

The Out of Eurasia project, involving more than 60 researchers, is using the latest technology to examine the relationship between 'mind and material': studying material artefacts helps to interpret at the development of cognitive capacity in our ancestors.

"The project, like the institute, evolved from my belief that we need to integrate many disciplines to create a new research field and build a new way of studying human history," says Matsumoto.

"We tend to think that scientific technology is the way to build a better world, but humanitarian aspects underpin many problems we face in the modern world, such as warfare and inequality.

"Often the humanitarian disciplines, such as history, archaeology and anthropology, tend to cluster in their own fields and it is not easy to carry out cross-disciplinary research either within the humanities or between the social and natural sciences," she explains.

"This project creates a research culture where many researchers of different disciplines can share new knowledge and technologies and come together to view the past from a different angle."

Matsumoto has been considering these ideas since she wrote her PhD dissertation on 'cognitive archaeology' – trying to understand how culture is produced through the interaction of mind and matter. "We usually think that mind and matter are totally different things, but nowadays many research fields are starting to think that they are not so clearly separated."

Out of Eurasia team member, Atsushi Iriki, is building a new theory about how the ability to use tools prompts changes in the brain and ultimately cognitive change. He proposes a positive cycle between our brain, cognition and the ability to create a new environment. Examining material culture, such as monuments and tombs, can provide a new understanding of human beings and culture.

RIDC researchers, Jun Mitsumoto, Joseph Ryan and Akira Seike, are studying the connection between the construction of monuments and the development of societies.

"Clarifying the connection between the development of society and the appearance, use and decline of monument construction is critical to enhancing our understanding of human history," Ryan says.

In Japan, the team is conducting drone-based LiDAR (a remote sensing technology that uses lasers to measure distances) to survey large earthen mounded tombs and the surrounding landscape. This allows them to survey much larger areas in greater detail than is possible with traditional mapping methods.

Javier Estrada, courtesy of the Los Chatos-Montana Archaeological Project

▲ One of the ongoing collaborative projects of Suzuki: Excavation at the Montana site on the Southern Coast of Guatemala.

A DEEPER UNDERSTANDING

The area around earthen mounded tombs includes different types of terrain and changes in elevation. Ryan explains that building a picture of this landscape helps a holistic understanding of the integrated relationship between it and the monument, which requires being able to map a very wide area.

"LiDAR is such an innovative tool because you can cover an extensive area using an unmanned drone or a small aircraft and develop an extremely detailed map."

For example, in a study of the Tsukuriyama tomb group in Okayama Prefecture, the LiDAR data suggested that construction of the tombs was closely tied to large-scale land development, and they were probably constructed along an early thoroughfare.

"This development involved not only the political and ritual aspects of the burial of a powerful elite group, but our research suggests that it was also closely connected to the creation of a major highway."

Another project team is doing LiDAR surveys of ancient archaeological sites in Mesoamerica, including Monte Alban and Teotihuacan in Mexico, and the results — where monuments were constructed and how the landscape around them was utilized — will be compared to results from Japanese sites.

Matsumoto says it is a strength of the university that they can do this comparative analysis between Japan and Mesoamerica.

MULTI-REGIONAL APPROACH

"Traditionally archaeology tends to focus on one region. Archaeological culture is so diverse it is usually very difficult to compare different parts of the world. Mesoamerica and Japan have been considered as totally different cultural worlds and nobody has seriously compared the two histories," she says.

"But these two cultures were developed from the small number of people who migrated out of Eurasia and it is very interesting how their cultural trajectories, despite being developed in very different worlds, show similar characteristics.

Working at the classic Maya site of Copán and as part of a team led by Kanazawa University, RIDC researcher Shintaro Suzuki specializes in bioarchaeology.

THE ABILITY TO USE TOOLS PROMPTS CHANGES IN THE BRAIN AND ULTIMATELY COGNITIVE CHANGE

Through microscopic observation of ancient skeletal remains, Suzuki collects information such as age and gender. "We gather information about lifestyles. If people lived a very sedentary or active lifestyle, this shows in their bones."

ISOTOPIC DISCOVERIES

Further isotopic analysis provides information about diet — for example, what type of plants people ate and where these came from.

His most significant finding has been the discovery of non-Maya people at Copán. Analysis of tooth enamel from burials revealed an unusual ratio of isotopes of the elements strontium and oxygen in the remains of around half the individuals indicating they originated elsewhere. "We could interpret that they came from the interior of Honduras," rather than the site where they were found, Suzuki explains.

People think of Copán as exclusively Maya because of the material culture and construction. "But our analysis shows non-Maya people were living in Copán and this region actively interacted with other cultures. They exchanged ideas and shared a similar language and diet. This dynamic interchange of culture is a very important finding." ■

OKAYAMA UNIVERSITY

www.okayama-u.ac.jp/index_e

ADVERTISEMENT FEATURE

Advertiser retains sole responsibility for content