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CHALLENGES AND CHANGES FOR ROCK ART RESEARCH IN THE DIGITAL AGE

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Rock art research has undergone a radical transformation over the last few decades as researchers are finding alternative ways to document, analyse and present their research. Much of this is based around digital enhancement and recording technologies that are providing us with new and innovative ways to capture, process, visualise and interact with rock art and rock art sites. Additionally, these technologies are creating a new set of practical challenges related to the curatorship and management of these digital rock art archives.

In this session we aim to draw attention to these alternative methodologies and the challenges that rock art researchers are facing by focusing on a series of themes related to:

Recording and dissemination of rock art
Digital curatorship of rock art
Rock art heritage management
Rock art outreach

The intention of this session will be to bring together speakers that are using new, innovative and alternative ways to deal with rock art and provide a platform from which they are able to share the challenges and changes these methodologies have brought. We envisage that this session will provide a stimulating setting for enriching discussions and allow for interesting heuristics that can help challenge and transcend many of the common regional and conceptual departmentalisations plaguing rock art studies.

Neolithic image, symmetry and context: challenges in montane stone from Cumbria, U.K.

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Keywords: Neolithic, RTI, digital technologies, Upper Eskdale, Cumbria

In 2015-17 surveys in the mountains of Upper Eskdale, Cumbria, U.K., revealed Neolithic sites and artefacts. The first site, a cairn near a prominent rock tor, features a façade boulder of banded Borrowdale Volcanic Series (BVS) rock with distinctive natural markings brought out through application of Reflectance Transformation Imaging (RTI). The second site features a slab of BVS volcaniclastic sandstone (Image 2), let into a socket on the edge of a small rectangular bay. The slab, a polissoir, features a raised concave panel with distinctive grooves, bevelled areas, geometric and other engravings, one set anthropomorphic, worked into it. New digital technologies, such as RTI and laser scanning help to reveal intricate surface detail on these boulders. New challenges involve the assessment of results from these studies alongside the incorporation of these digital technologies into the montane archaeological settings and landscapes of the stones. Here the application of LIDAR and other digital remote sensing, such as GPR, have specific limitations due to complex geologies and thin stratigraphies.

Digital recording methods for rock art - what to do next?

The documentation of rock art has noticeably changed through the last decades. While the usual hands-on-methods like tracing are nonetheless still in use there are also new techniques with non-destructive digital methods such as RTI. Another of those digital recording methods is the digital 3D-photogrammetry via Structure from motion. This technique is now widely used to support epigraphic work or the documentation for excavation. While this process can be used for recording rock art, especially concentrating on the overall place of its installation, the usage of such 3D models is problematic, as there are considerable limitations with publishing this kind of digital data. This also applies to the vast number of photographs which usually accompany the rock art documentation process. Most (paper or online) publications are not able to cope with the modern output of digital data. This paper will give an insight into one possibility of publishing digital data, like 3D models, in combination with a "normal" online publication process. This is the "Citable"-project of the Excellence Cluster "TOPOI – The Formation and Transformation of Space and Knowledge in Ancient Civilizations".

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Keywords: structure from motion, 3D models, digital data, publication, rock.art Egypt

The latest technology or traditional recording methods - why not both? An argument for including artists in rock art recording teams

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Keywords: rock art, Australia, artists, natural history illustration, Hunter Valley, innovative methodological approach

While the technological advances of the past decades have brought about many exciting changes to the field of rock art research there is a risk that the current focus on the latest gadgetry is overshadowing other methodological approaches. In the Hunter Valley of Australia, a team of Natural History Illustration students from the University of Newcastle have been going into the field to record rock art sites as part of their 'Shared History Project'. They have been working alongside Aboriginal representatives, drone pilots, archaeologists, conservators, historians, archivists, and digital recording specialists using the latest 3D capture technologies to visually document the rock art sites along the sandstone ridge that stretches between Newcastle and Sydney. All of the artworks are shared with the local community, effectively building a sense of connection with the fragile sites. Their interpretive and informative artworks are complementing the latest scientific methods of rock art research and are helping to tell a story that is both comprehensive and emotive and includes illustration of associated stories and environment. In this paper, we will argue that the inclusion of artists in rock art recording teams, alongside specialists using the latest technology, could be a more effective and innovative methodological approach for the future.

Using Digital Data to review Gender Construction in the forager Rock Art of the Brandberg/ Daureb, Namibia

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Keywords: scenic configurations, gender construction, data mining, third gender, rock-art database

Over the last 30 years, the Cologne based project "The Rock Paintings of the Upper Brandberg" has documented and published over 800 sites with over 43,000 painted figures comprising about 80 % of the mountain's rock art. The corresponding database – modelled on linguistic and Gestalt theories – has been analysed since the 1990s, revealing that human figures are not generally gendered by appearance, style or activities. Careful analysis points to certain combinations of features, activities, gender specific postures and objects handling as typical for particular genders. Furthermore, a third gender with typical expositional features and narrative actions can be identified. By comparison on different scales (single figures, figure pairings, and co-occurrence within all sites), the presence of male and female dominated social situations becomes evident. In this context, depictions of humans of all genders in their specific scenic configurations and spatial localization appear also to reveal a discourse on social roles, thus inviting interpretation as male and female initiation rites and the role of "zero marked" gender performance in the forager rock art. Here, distinctive attributes (body decoration, postures, tool handling) are counted instead of depicted sexes, though these are also significant as are displays of typical all-gender performance in interacting with children (e.g. carrying a child).

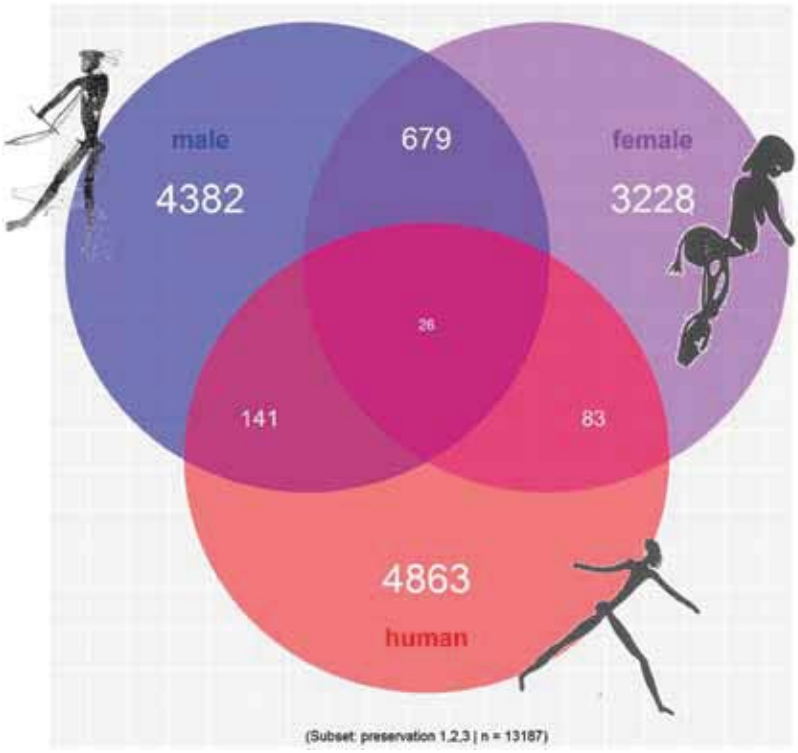

Fig. 1 - Sex categories of human figures and their gender performance (Oliver Vogels)
Fig. 2 - Example of gender performance when carrying child, Daureb-Namibia (Heinrich-Barth-Institut)

Comparing the use of R.T.I. (Reflectance Transforming Imagery) and photogrammetry in wadi Abu Subeira (Assuan, Egypt): what technology for which context?

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Keywords: RTI, wadi Abu Subeira, Egypt, photogrammetry, digital technologies

The research being presented focuses on the rock art of an Eastern Egyptian Desert location, wadi Abu Subeira. A French-Egyptian team headed by G. Graff has been working on an archaeological concession in this wadi since 2012. Around 400 rock art sites have so far been recorded, dating from Epipaleolithic to Modern times, with a majority of the sites belonging to the predynastic period (fourth millennium BC). The focus of this current research is a critical comparison of different digital technologies, in particular RTI (Reflectance Transforming Imagery) and photogrammetry. To facilitate this comparison, we have been able to use these two technologies on the same panels or on panels in close proximity. As such, it is possible to compare the results of both technologies and assess their ease of use, flexibility and the advantages one over the other in the context of the site and scientific objectives. The aim is to find the most adaptable solution on a case by case basis.

Revisiting digital near infra-red (NIR) photography for subterranean rock art recording

Whilst the value of using NIR photography in rock art studies has been realised it remains seldom utilised, a situation that has slowly begun to change with the advent of digital photography. The seminal paper by Fredlund and Sundstrom (2007) has demonstrated how it is possible to use consumer level digital cameras to take pure or false-colour NIR images of rock art. However, whilst good results were obtained, the methodology and techniques employed were largely unsuitable for operating within a subterranean environment. Consequently, we sought to devise an alternative methodological approach. One that would allow us to use digital NIR photography deep within the confines of a cave, where using a generator and not being able to see through the viewfinder was both impractical and dangerous (Fredlund and Sundstrom 2007: 737). Within this paper we will present the work undertaken in the Dahaisi cave on the island of Soqotra, Yemen, focusing on equipment and methodological approaches developed in consultation with leading authorities within the professional imaging industries of the U.K., subsequently producing a cost effective and readily accessible solution to working in the confines of a subterranean environment.

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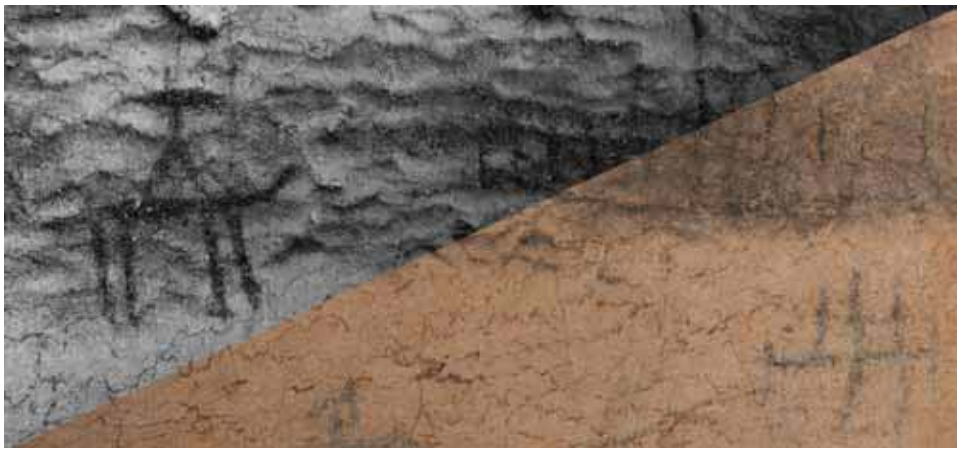
Keywords: Near Infra-red (NIR), photography, subterranean, Soqotra, Yemen



Marketing rock art in the early twentieth century: Frobenius, Africa and New York

Frobenius was the most famous German anthropologist of the first half of the twentieth century and an ambiguous figure. His endeavours as rock art researcher are less known. He believed that the great rock art tradition, which had flowered during the ice age in Europe, had not entirely vanished but persisted first in Northern Africa and spread from there to the rest of the continent. To prove this continuity, from 1913 onwards, he undertook a number of expeditions to northern and southern Africa, always taking along professional artists to copy rock art onto paper and canvas. Combining oral tradition and ethnographic analogies, he was the first to speculate about shamanic practices depicted in southern African rock art. He had established the world's largest archive of painted rock art copies by the 1930s and then sent out further expeditions to document rock art in Europe (Spain, France, Italy, and Scandinavia), as well as in New Guinea and Australia. This paper traces the story of Frobenius's expeditions, his ideas about rock art as well as the huge success he had in exhibiting rock art in the 1930s in Europe and in the USA.

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Keywords: history of rock art research, Frobenius, Africa, expeditions, exhibitions, reception

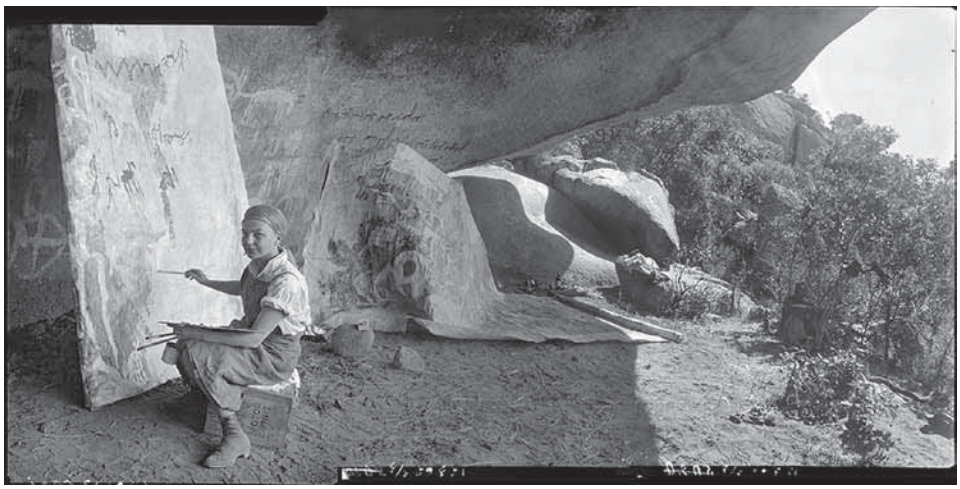

Fig. 1 - The artist Agnes Schulz copying rock art 1929 in the Matopo Hills in Zimbabwe. (copyright Frobenius Institute)
Fig. 2 – Display of the exhibition "Prehistoric Rock Pictures in Europe and Africa", Museum of Modern Art, New York, 1937. (copyright MoMA, N.Y./ Scala, Florence)

The 3D Pitoti Scientists' Lab: collaborative visual analysis of prehistoric rock art in a multi-scale virtual environment

We present a novel, multi-user, virtual reality environment for the interactive, collaborative 3D analysis of large multi-scale 3D scanning data and report on our experiences of using this technology for rock art research. Our experimental system consists of a real-time rendering system for large 3D point clouds, a multi-user 3D display infrastructure and a suite of collaborative 3D interaction techniques and tools. A multi-scale 3D scan of the cultural heritage site of Valcamonica in Italy with its large collection of prehistoric rock-art served as the test case for its evaluation. The system design in this initial application results from an in-depth exchange with a small group of archaeologists with expertise in rock-art. It allows them to explore the prehistoric art and its spatial context with a highly realistic visual appearance. A set of dedicated interaction techniques was developed to facilitate collaborative visual analysis. A multi-display workspace supports the immediate comparison of geographically distributed artifacts. An expert review of the final demonstrator confirmed the potential for added value in rock-art research and the usability of our collaborative interaction techniques.

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Keywords: multi-user virtual reality, multi-scale 3D scanning data, visual data analysis

Recent Rock Art Studies in the Misool Islands, Raja Ampat, West Papua

Geographically the Misool Islands were considered, in the past, as a bridge for navigation by the sailors from Seram Island towards Papuan land. Documentation of rock art in the region of the Misool Islands, Raja Ampat archipelago, in the Province of West Papua, has been reported since the 17th century, more precisely from 1887. The study of rock art in this area has developed further in the last ten years, including research on the maritime cultures. The recent research in the region has been carried out by the National Research Centre of Archaeology in 2014 and 2016. From this we could uncover more than a thousand images of the rock art in the area, including human figures, marine fauna, boats and geometric images, spanning over fifty sites situated on the karst cliffs, rock shelters and caves. The analysis within this research related to the social meaning of the rock art as well as the art's connection to Austronesian cultures and maritime cultures in the area. The results of this research will expand knowledge for the development of maritime research associated with Austronesian cultures.

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Rock art, authenticity and digital prestidigitation

The digital age continues to add complexity to debate on art and authenticity. Rock art, seemingly undeniably 'authentic' is not, however, immune from this debate. Indeed, we have remarkably little clarity on what 'rock art' is – or is not. Combined with the rise of contemporary archaeology, it behooves archaeologists to not only gaze back on past rock arts – but also to imagine what future rock arts might look like. Historical inscriptions and graffiti provide useful case studies through which to examine rock art's theoretical adequacy as well as test its methodological and interpretive limits. Digital manipulations of rock art are equally useful in interrogating often spurious notions of 'accuracy', while dealing with the place-embedded nature of most rock arts. Using case studies from northern Australia, southern Africa and San Francisco, I examine how the digital aids and hinders our understand of past place-making practices through rock art.

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Keywords: authenticity, digital, future, graffiti, Indigenous

Unraveling the Sequence of Rock Art Superimpositions in Cerro de los Indios 1 (Santa Cruz Province, Argentina)

This paper focuses on rock art manifestations in Cerro de los Indios 1 (CI1), a shelter in the Santa Cruz Province, Argentina, occupied by hunter-gatherer groups throughout the last 4000 years. Stylistic traits of certain motifs suggest a longer, more continuous occupation of the site than previously established. This triggered the question as to whether the execution of art could have been an independent activity, or if it changed throughout time as the use of CI1 varied. To approach this, an analysis of superimpositions was proposed. The way motifs were executed over preexisting ones can provide information on different decisions taken regarding previous manifestations; these attitudes are likely to have varied throughout time as relationships between groups and their environment were altered. For this analysis, the photographic record of CI1 art processed with DStretch was traced on vector graphics software, dividing in layers each tonal series as found in the superimposition sequence. By choosing which layers to make visible, it became possible to observe how subsequent occupants treated the preexisting motifs, and therefore identify if the moments of the sequence corresponding to variations in the use of CI1, manifested changes in the perception of the preexisting art.

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Keywords: Patagonia, vector graphics, hunter-gatherers, superimpositions, rock art

Phantoms on granite: evidence of Iron Age engravings in Western Galicia (NW Iberia)

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Keywords: granite, engraved, Iron Age, horse, warrior, superposition

Hitherto Côa Valley, in north Portugal, was known as the only area with Iron Age open-air rock art in N.W. Iberia. The purpose of the research being presented is to reveal new data about protohistoric rock art out of hillforts in Galicia. Galician rock art is known for its prehistoric engravings, which are mainly made on granite bedrocks. This type of stone has a wide range of physical and chemical characteristics due to its geological origin. Over time, the rocky outcrops had endured weathering processes that engendered sandy and corroded surfaces. In fact, this degradation shapes the visual appearance of engraved supports and, consequently, their recording. In the case of the engraved supports located in Western Galicia, they show scenes with zoomorphic figures, horses with riders or warriors. The composition of the scenes was created by overlapping layers of figures, at least in three panels.

To examine and understand the engraved panels, we used methodologies which included photography with oblique lighting and coloured gels (for filters) complemented with photogrammetry and geological analysis. Moreover, the geological analysis of granitic etched surfaces will cast new light on Galician rock art studies and it will increase the inventory from Protohistory and other rock art periods.

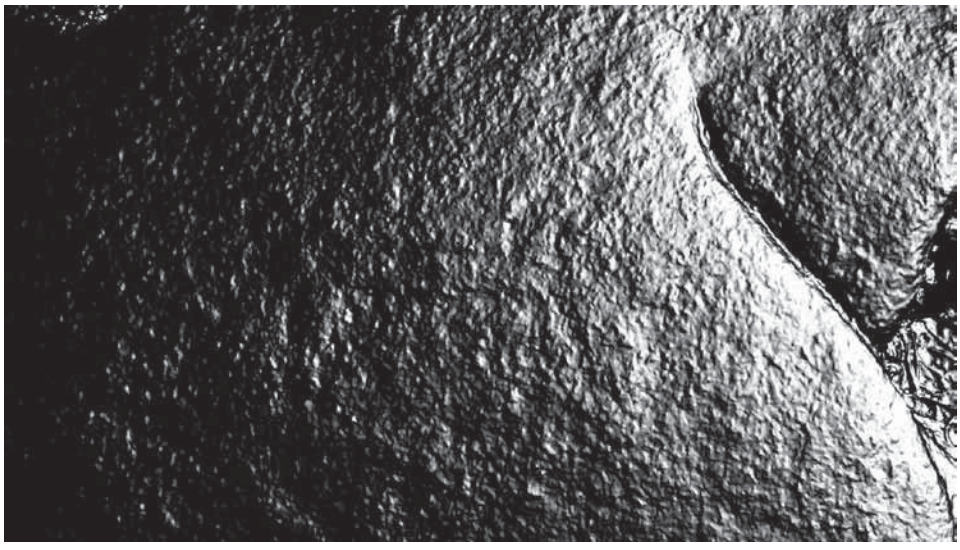

Fig. 1 - A Xesteira 8 (Moaña, Pontevedra). Oblique lights photograph. (author Alexandre Paz Camaño)
Fig.2 - A Xesteira 8. Photogrammetry capture. (author Eloy Martínez Soto)

Rock Art as a Contextual Archive: Respecting Cultural and Spiritual Dimensions within a Comprehensive Scientific Approach

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Keywords: rock art, archive, Australian rock art, Australian Aboriginal, GLAM sector

This paper approaches Rock Art as a human archive; applying archival theory to archaeological practice in Aboriginal cultural sites to build knowledge about their context, cultural landscape and wider relationships for future preservation and care. Aboriginal site recording to date has been largely limited within the purview of archaeologists and anthropologists working in conjunction with Aboriginal people. This paper proposes that the GLAM sector (i.e., Galleries, Libraries, Archives and Museums) can play a new role in comprehensively broadening the recording of Rock Art sites as "archives in the field" safeguarding their evidential nature in a scientific framework. The GLAM sector offers multidisciplinary perspectives that are underutilised in terms of projects and engagement with Aboriginal communities and culture. This wide discipline approach encourages other knowledges to also be applied to the study of Rock Art, such as those that enhance social and emotional well-being and what can be done in practical terms of learning, advocating and sharing knowledge that respectfully honours the First Peoples of Australia, through professionalism and respect. The University of Newcastle"s GLAMx Living Histories Digitisation Lab has been associated with the rock art projects of Wollombi, Hunter Region of NSW, involving historical research, survey documentation, illustration, education and advocacy.