Maritime Archaeology Graduate Symposium

2021

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Aix-Marseille University (AMU)
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Book of Abstracts

Honor Frost Foundation
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Mediterranean Archaeology Institute - ARKAIA

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Welcoming Message

Since 2018, the Maritime Archaeology Graduate Symposium (MAGS), inspired and supported by the Honor Frost Foundation, has encouraged students and young scholars to present their research in the form of research papers and posters, in order to share their results and ideas and engage in enriching discussions. Maritime archaeology is developing thanks to the application of multidisciplinary approaches, innovative research methodologies and techniques. We hope that these new orientations will be reflected once more in this year's Symposium with the participation of early-career researchers (Master's and PhD students, post-doctoral academics).

This year, MAGS 2021 will be hosted for the first time by Aix-Marseille University. Because of the constraints of Covid-19 pandemic, it will be held in a hybrid format. As every year, MAGS is supported by the Honor Frost Foundation. Since Honor Frost, a pioneer in the field, primarily worked in the eastern Mediterranean, the first day of the Symposium will be devoted to maritime archaeology of this region. However, research papers and posters beyond the eastern Mediterranean will be presented on the second day. We hope that this virtual symposium will be an opportunity for the gathering of many young scholars working on a large range of subjects that will highlight the diversity and richness of maritime archaeological research internationally.

We would like to thank the supporting institutess, Honor Frost Foundation, ARKAIA – Institut d'Archéologie Méditerranéenne – Aix-Marseille University, MoMArch (Master of Maritime and Coastal Archaeology) – AMU, Centre Camille Jullian [AMU-CNRS (Centre national de la recherche scientifique) – INRAP France] and DRASSM (Département des recherches archéologiques subaquatiques et sous-marines), French Ministry of Culture. Special thanks go to Dr. Lucy Blue, Prof. Kalliopi Baika, and Maria Michael for all their guidance and support.

Organizing Committee

- Jafar ANBAR, PhD candidate in maritime and coastal archaeology of Aix-Marseille University and the National and Kapodistrian University of Athens, HFF scholar.
- Judith GATT, PhD candidate in harbour archaeology of Aix-Marseille University and the University of Cyprus, HFF scholar.
- Labrini TSITSOU, PhD candidate in coastal geoheritage of Aix-Marseille University and the National and Kapodistrian University of Athens.

Guidelines for participating in MAGS 2021

For participating in the **hybrid MAGS 2021** please use the following links:

25th of November https://univ-amu-fr.zoom.us/j/97381545181?pwd=Y1FZUWF5VXVZdWxFanFjVTR4ZzRiUT09

26th of November https://univ-amu-fr.zoom.us/j/92342990202?pwd=VWZsQ1VUSWwzNlg0R1NTUHk0eVpVdz09

The schedule is based on PARIS time.

During the symposium:

- ✓ Keep your PC charged.
- ✓ Connect to the internet through an internet cable, if applicable.
- ✓ Mute your camera and microphone when joining the Zoom meeting. Turn them on only while speaking.
- ✓ Type your questions in the chat box, or ask a question out loud by using Zoom's 'raise hand' feature.
- ✓ If you are physically present in the Symposium please make sure to wear your mask and sanitize your hands frequently.

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Paper Abstracts

Title: An Overview of the Structure and Organisation of the Ancient Egyptian Navy during the XVIII Dynasty

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The study of Egyptology is one of the largest subdisciplines within the field of archaeology, and yet relatively little attention has been given to Egypt's role as a naval power in comparison to other contemporary Eastern Mediterranean powers. However, there is plenty of evidence found in tomb inscriptions, papyrus documents, and temple reliefs to suggest that the Ancient Egyptians possessed a strong naval force that was utilised both during periods of civil strife and imperialistic expansion. This paper will analyse the available data on the structure of the Ancient Egyptian Navy during the 18th Dynasty of the New Kingdom Period, focusing on the social progression of key naval personnel and the overall chain of command. This paper will focus on the tomb inscriptions of several notable officials within the Egyptian Navy, and analyse any trends in their progression up the Naval command. Tomb inscriptions can provide a valuable source of information on the structure of the navy, often including career progression and all the various titles held by naval personnel, since they wanted to hold the same social status in the afterlife as they did in life. Ultimately, this paper aims to shed new light on the Ancient Egyptian Navy through the use of tomb inscriptions, an aspect of Egyptian military history that has seen little scholarly attention.

Title: Fishing Boats in Egypt in the Islamic Period

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The importance of this research is based on the lack of information about fishing boats in the Islamic era in Egypt, as most sources focus on commercial or military boats of this time period. Therefore, the researcher used some sources, in addition to papyri, with references to boats in the Islamic era as well as records of some visitors of Egypt during the period under study.

It is clear that the use of rafts continued in the Islamic era in Egypt, and this is illustrated by Captain Frederick Ludwig Norden the Younger during his travels on the Nile with the Danish Navy in 1737. He noticed that the Egyptians used rafts for fishing and crossing the Nile. The rafts were made from ceramic pots stacked, attached to each other, and covered with palm leaves. This is in addition to the use of papyrus boats, whose use began in the ancient Egyptian era and continued in the Islamic period in daily life for activities such as fishing and crossing water channels.

Finally, there were almost three shipbuilding yards in Egypt that played an important role in the development of the ship industry. Although the yards worked mainly for the manufacture of ships for the navy, wooden boats were also built for the purpose of fishing. In other cases, they were built individually by carpenters or fishermen themselves.

Title: “Fishing” of Knowledge: The Case-Study of Cyprus

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The current paper explores the tradition of fishing on the island of Cyprus through time, from the Neolithic to Early Christian periods. It forms part of a PhD thesis which attempts to gather all the available evidence for fishing in Cyprus for the first time in a single body of evidence.

Fishing is usually defined as the activity aiming to catch fish for food, either as an occupation or as entertainment. The fisher is the one that decides the development of fishing activity and creates the fishing gear that is needed to achieve the capture of fish. Their decisions are affected by many technological, social, economic, cultural, biological, and environmental factors. As a result, fishing activity can be characterised as a multi-dimensional process which can be understood through the study of material culture and the mental maps of fishers.

The research presented here strives to study the available archaeological evidence of fishing technology with fishbone assemblages, iconographic and written sources, environmental, biological and ethnographic data, in order to contribute towards a more holistic understanding of the multi-dimensional synthesis of fishing activity in Cyprus through time. In other words, this approach determines the presence or absence of fishing activity within the Cypriot maritime landscape and seascape over time and highlights the relationship between fishers and their environment.

Title: Shipyards in Egypt Between Antiquity, Nowadays, and the Future

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Sea and seafaring had played an extensive role in building civilizations in the Mediterranean region; Therefore, it is required to study the Mediterranean ships. However, ships have always been studied as machines, but it is not common to study shipyards where ships were built and repaired. Studying shipyards reveals evidence that supports the studying of ship construction and building techniques, as shipyards illustrate a lot of information about the process of building from its very beginning, when a ship was just an idea and then transformed into a reality through wood and metal. Shipyards indeed reflect both the materialistic aspect represented in tools and material, and the cultural aspect represented in labourers and builders. Many of the archaeological excavations around the Mediterranean generally, and in Egypt specifically, revealed indications of shipyards, which will be presented. This paper aims to present shipyards in Egypt in antiquity and nowadays, in addition to their future outlook. Ethnographic research is the main methodology used in this study to define the characteristics of nowadays shipyards, as well as the archaeological and historical evidence to read the past of shipyards and imagine their future.

Title: Knowledge Transfer and Ship Building in the Archaic Mediterranean

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Scholarship on shipbuilding technologies in the ancient Mediterranean recently has argued for ethnic patterns of shipbuilding techniques by examining the hull remains of wrecks for diagnostic features of construction (e.g. Pomey and Boetto, 2019). However, these studies misleadingly isolate distinct traditions of ship construction by assigning them to different ethnic backgrounds, such as separating a so-called "Greek" tradition of shipbuilding from "Phoenician" in the Archaic period. This approach creates an evolutionary model of technological change to explain the appearance of the mortise-and-tenon joint in the repertoire of "Greek" shipbuilders and the gradual transition away from sewn-boats. Instead, this paper argues that identifying ethnic patterns of shipbuilding ignores the complexity of technological exchange in the highly-interconnected seascape of the Archaic Mediterranean. This paper re-evaluates the hull remains from two Archaic wrecks from different regions of the Mediterranean that were constructed using mixed assembly technologies: the Pabuç Burnu shipwreck in the Aegean and the Jules-Verne 7 shipwreck at Marseille. It contextualizes these wrecks within a broader historical framework that recognizes the impact of mobility on knowledge transfer and the exchange of shipbuilding techniques to show that overlapping spheres of technological interaction, rather than ethnic traditions, influenced the adoption of new methods of naval construction. Ships built using a combination of assembly techniques were not just transitionary stages between sewn and mortise-and-tenon methods in an evolutionary framework. Instead, these shipwrecks attest to the increasing interconnectedness of the Mediterranean in the Archaic period that facilitated the exchange of materials, people, and technological ideas.

Title: Effective Management of Archaeological and Historical Shipwreck Sites in the Red Sea, Egypt

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Each year, the SCUBA diving industry creates nearly a billion-dollar economy and creates numerous job opportunities; many jobs and dive attractions are found in developing countries. Several of the globe's premiere diving sites, such as the Thistlegorm in Egypt, and Chuuk Lagoon in the central Pacific, are Underwater Cultural Heritage (UCH) sites which attract many visitors a year (Jeffery, 2004; Schofield, 2019). It is estimated that the Thistlegorm alone brings in 5 million Euros of revenue a year and attracts thousands of visitors each year to the Red Sea of Egypt (Brown et al., 2020; Kean, 2009). When managed effectively, UCH sites, specifically historic shipwrecks, can be intellectually, culturally, and financially enriching for the surrounding community.

Seemingly, the lack of oversight, regulation, and education of divers regarding archaeological and historic wrecks places these UCH sites at risk for a litany of issues (Edney, 2016). Active threats to preservation efforts include illegal salvage, looting, destruction of archaeological integrity, and increased decomposition of the wrecks and their contents (Abd-el-Maguid, 2012; Campbell, 2013; Edney, 2016).

This research aims to examine the obstacles and methods necessary to develop and implement sustainable management plans to protect and promote public accessibility to historic wrecks. For the purpose of this study, suggestions for effective site plan management will be developed by evaluating three at-risk UCH wreck sites of the Red Sea: the Roman wreck site at Fury Shoals, the 18th century Ottoman merchant ship of Sadana Island, and the Thistlegorm WWII shipwreck.

By comparing three separate UCH sites, all with different traits, conditions, and circumstances, an effective guide for creating project management plans for UCH can be devised and accomplished.

Title: Red Sea Heritage: Presenting the Stories of the Western Coast in Egypt

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The western coast of the Red Sea in Egypt is rich with archaeological sites that cover a wide chronological range from ancient times to the 20th century. Major excavation work has been conducted at specific sites in this region. Still, little attention has been paid to the long-term management of these sites. In particular, with the exception of the pioneering work done at Quseir, even less focus on community engagement and sustainable archaeological development for the benefit of the local community has been given. Thus, there remain questions about the potential role of these archaeological resources and the feasibility of applying these theories and approaches.

Moreover, several factors form direct threats to these sites, such as unmonitored touristic activities, power plants, and fast-growing urban development in the form of so-called luxury resorts. This raises the importance of introducing these sites as heritage spots and touristic venues through the display of the sites and visitor engagement by means of interpretive site management plans, including community participation.

This paper discusses how the research is concerned with assessing the contribution of the Red Sea heritage sites to the local community development to ensure sustainable revenue directed to the community as well as safeguarding the sites. The paper explores the research questions, methodologies, objectives and previous research, then discusses the archaeological context of three archaeological sites along the coast through both desk-based and environmental impact assessments.

Title: Ugarit's relationship with Crete through the study of Mycenaean pottery with depictions of chariots

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Ministry of Culture of the Syrian Arab Republic

The Late Bronze Age (L.B 1600-1200 BC) in Syria is divided into Late Bronze I (L.B I 1600-1450 BC), Late Bronze II (L.B II 1450-1350 BC), and Late Bronze III (L.B III 1350-1200 BC). The port city of Ugarit was a vibrant urban centre strategically located on the overland network linking Egypt with Asia Minor, Persia and India at the east, and Greece and Cyprus at the west. The city's origins date back to 3000 BC and the first alphabet and alphabetic writing system are believed to have developed there in the 14th century BC.

Trade between Syria and Crete is attested through Mycenaean pottery coming from the city of Enkomi, Cyprus. We have several depictions of diplomatic vehicles (chariots) specific to that region, but that were not used in Syria. The type of chariot found and used in Syria consists of two parts separated by a wooden barrier with a door, and each section was designated for one person. Fifty-two examples (ranging from complete and broken jars) were found in burials, temples, the royal palace and royal residences of Ugarit. In the north of Syria, in particular in the city of Alalakh, they were found in the temple as well as in the residence quarters.

The presence of this pottery in Syria is demonstrating the interconnection of these two civilizations and the trade relations between them. This pottery was presented as a gift to kings, especially to the kings of the city of Ugarit. The depictions on several of them represent vehicles transporting diplomats, with a driver and horse-trainer standing at the front of the carriage, as well as scenes of animal husbandry and hunting.

The aim of this research is to try to understand the cultural connections and influences between Ugarit and Crete. This will be undertaken by the study of the archaeological objects found in Syria and Greece in different architectural contexts in situ, as well as in museums. Concerning the pottery found in Syria, the methodology will consist of providing a new systematic archaeological documentation, i.e. redrawing, photography and 3D modelling, combined with bibliographical research.

Title: Back to Arwad on the Footsteps of Honor Frost:
Archaeological and Topographical Documentation 2021

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The paper presents the preliminary results of the 2021 archaeological survey on Arwad island, Syria, undertaken in the framework of my PhD research.

The PhD research concerns the maritime geoarchaeological study of a number of important harbour settlements on the southern part of the Syrian coast, from the modern city of Tartous to Tabbat Al-Hammam – along the submerged reef of Arwad. The study is primarily focused on Arwad island which served as a naturally-protected multi-function harbour (commercial, military, shipbuilding activities) from the Bronze Age and is still in use today. Arwad constituted a navigation landmark of the Syrian coastline, located at the crossroads of major trade routes between the Egyptian, the Hittites, and the Mesopotamia civilisations. According to literary sources, the island functioned in a maritime network connected with harbour-cities on the mainland and the islands nearby (Antarados, Marathos, Tabbat Al-Hammam, Machroud and Al-Abbas). The archaeological sites under study possess several built and rock-cut archaeological structures (harbour infrastructure, breakwaters, coastal fortifications, quarries, etc.) as well as open anchorages.

Specifically, the research aims to create an interdisciplinary GIS database, that will integrate data from a systematic archaeological documentation of the sites, through coastal and underwater fieldwork, and coastal interdisciplinary research: study of the coastline evolution and relative sea-level change aiming at the maritime landscape reconstruction of the reef of Arwad diachronically.

The 2021 fieldwork survey focused on the systematic documentation of three archaeological sectors of Arwad island. It consisted of systematic 3D topographical survey, architectural documentation, and aerial drone photogrammetry of the coastal and underwater archaeological remains. The collected data, today under study, were integrated in a GIS database whose architecture is under construction for the optimum analysis and management of all published and new interdisciplinary information from the southern part of the Syrian coastline.

Title: Revisiting the Construction Techniques of the Classical and Hellenistic Harbour Works of the Island of Cyprus

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This paper explores the Classical and Hellenistic construction techniques that are identified in the harbour works of the island of Cyprus. Previous research (Theodoulou, 2006; Leonard, 2005; Raban, 1995; Marangou, 1997; Empereur et al., 2018) has already concentrated a rich corpus of information on the ancient harbour structures of the island. Despite these considerable efforts, their construction has been constantly examined under the shadow of the Phoenician and Greek tradition, which both of them date back to the Late Bronze Age and Archaic period (Raban, 1995; Marangou, 1997; Theodoulou, 2006). Furthermore, the lack of a systematic and comparative study that takes equally into account the Classical and Hellenistic harbour works of the Eastern Mediterranean and the Aegean underlines the need to revisit the ancient harbour structures of the island and further investigate the character of their construction. While considering the limitations of this study, an attempt to identify traces of local harbour construction techniques will be undertaken through the case study of Amathus, a submerged Hellenistic harbour on the south coast of Cyprus, which still preserves its structures in a remarkable state.

Title: The Ancient Harbour of Lechaion in Corinth, Greece: Preliminary Results from the Excavation, Documentation, and Conservation Actions of its Submerged Wooden Structures

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Lechaion was the harbour of the ancient city of Corinth in Greece. It is situated on the northeastern coast of the Peloponnesian peninsula facing towards the Corinthian Gulf, and only about four kilometres to the west of the modern city of Corinth and the mouth of Isthmus, therefore allowing access to both the eastern and western Mediterranean Sea. This particular geographical advantage explains partly the influence ancient Corinth had as a city on all known maritime networks and trading routes around the Mediterranean Sea. The harbour of Lechaion was originally constructed around 600 BC and recent evidence suggests that the harbour remained in use until the 12th century AD.

Underwater excavations of the site from 2013 to 2018 performed by the Lechaion Harbour Project brought to light exceptionally well-preserved wooden constructions connected to the harbour's infrastructure. The remains consist so far of several wooden formworks (caissons) and groups of wooden posts which form complementary piers and retaining walls to the existing stone structures, thus representing a unique archaeological find discovered in the Greek seas and one among the very few in the Eastern Mediterranean Sea.

The paper aims at presenting the preliminary results from the excavations undertaken so far of these unique wooden remains, and addressing the issues raised regarding chronology and building techniques applied. In addition, it reports on the apparent preservation condition of the wooden material and the preliminary approach for its *in situ* preservation within a challenging underwater burial environment.

Title: Geoarchaeology of Populonia and Talamone Etruscan Harbours (Tuscany, Italy): A Pluridisciplinary Synthesis

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Etruscan harbours in Tyrrhenian Italy were rarely searched and found, even though much evidence prevails, from ancient texts to artefacts. They were commercial hubs on an Etruscan and even Mediterranean scale. Bronze and iron objects, food products, and wine constituted the major part of exchanges. Some hypotheses explain this archaeological hiatus by the fact that Etruscans use their natural environment and calm places for the establishment of harbour basins. These environments were dominated by bedrocks and lagoons during Antiquity and remain poorly understood, in particular their diachronic evolution. The Populonia and Talamone cases show this. They have mainly been studied for their necropolis, acropolis, and temples. A comprehensive geoarchaeological study could close the gap between harbours and their surrounding environment.

This study drafts this pluridisciplinary consideration by a bibliographic synthesis based on existing data (historical, archaeological, geological, geomorphological, palaeoenvironmental) and a multi-proxy analysis (sediments, ostracods, shells, minerals) on the two first sedimentary cores from Fonteblanda, in the gulf of Talamone. Cores couldn't confirm nor invalidate the existence of a harbour but could offer data about the environment evolution since the beginning of the Holocene. They illustrate the part of the watershed and the sea in the gulf of Talamone's context. By combining these studies, it is possible to propose a hypothesis on the location of harbours in Etruscan times and to formulate the coming fieldworks (geophysical, terrestrial, and underwater surveys, archaeological excavation, sedimentary cores).

Title: Archaeological Remains from the Mistras Lagoon (Sardinia, Italy), Harbour of Tharros During the Archaic and Punic Period (7th-3rd c. BC)

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The Mistras Lagoon, in Central-West Sardinia (Italy), has been identified as the harbour of the city of Tharros during the Archaic and Punic period (7th-3d c. BC) thanks to archaeological and geomorphological investigations. A sandy barrier present in the middle of the lagoon, interpreted as a palaeobeach, was investigated during different excavation campaigns. Numerous archaeological materials were recovered during the excavations, in particular ceramics, mostly transport amphorae, archaeozoological remains, and a huge amount of vegetal remains preserved thanks to the waterlogged and anoxic conditions. The ceramics reflect on the one side the importance of local productions, as these represent the great majority of the recovered fragments, and on the other side the varied, even if not abundant, productions arriving to Tharros from other parts of the Punic world as well as from other parts of the Mediterranean. Between the vegetal remains the carpological ones, seeds and fruits, highlight the presence of a diversified agriculture, and testify the import or introduction of new species. Furthermore, some of the xylological remains can be attributed to manufactured wood, attesting the use of this material for objects usually known in the ceramic repertoire, as in the case of a wooden dish, and rare fragments that could be attributed to ships or boats.

Title: Harbour ArchaeoEngineering (HAE). Methodological Approach to the Incorporation of Port Engineering and Coastal Engineering Techniques in the Archaeological Study of Ancient Harbours

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Within the research field of harbour archaeology, the interaction of the harbour geometry and the harbour works with the maritime environment has been scarcely developed, despite the fact that port structures rest on a fringe of land-sea interaction. Although there are different works in the literature that enhance multidisciplinary studies that incorporate aspects related to climatology (waves and wind) and the physical environment (sediments) and their interaction with harbour structures, a method that allows the integration of current knowledge in the field of port and coastal engineering has not been developed.

The aim of this work is the incorporation of meteo-oceanographic analyses and numerical models developed by contemporary coastal engineering to complement traditional approaches to the functionality and operability of ancient harbours. It is a diachronic, multi-scalar, and interdisciplinary methodological approach that integrates archaeology, geomorphology, meteo-oceanography, and port and coastal engineering. In the framework of harbour archaeology, considering the sea as a dynamic and active entity can lead to new developments; the sea not only as a medium where the structures rest, but as an agent that is alive and interacts with the structures.

Therefore, this work advocates the establishment of a new approach to the study of maritime cultural heritage by considering how people understood and treated nature through the structures they built, how they interacted with the environment and, to some extent, by analysing the conditions in which maritime societies developed around harbours.

Title: The Fortress of Sarda-Shurdhah (4th-15th c.): Documenting Submerged Archaeological and Cultural Heritage in a Dam context

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The 20th century saw the construction of thousands of large-scale dams directly impacting heritage sites and archaeological remains. These cultural and historical landmarks are strongly impacted by the landscape evolution provoked by these industrial developments. Valleys and rivers have given way to modern artificial lakes and reservoirs. In the 1970s, the construction of the Vau i Dejës hydroelectric dam in northern Albania's Drin valley led to the partial submersion of the medieval fortified city of Sarda-Shurdhah. Completely abandoned at the edge of the Ottoman period in the 15th century, this elevated site presents a high potential in social and urban-shapes studies in Late Antiquity, and Medieval Balkans studies. Emergency excavations were conducted before the submersion of the lower parts of the city, yet only a slight part of the site was identified, and major parts of the fortifications and urban elements are still to be studied. However, significant parts of the site are now located underwater, thus causing new challenges for the archaeological documentation.

This research was conducted in the framework of a Master's dissertation, aiming to prepare the ground for future operations that will focus on the submerged parts of Sarda-Shurdhah. A synthesis of a historical and archaeological bibliography marks the first step of this work. In 2020, a coastal survey took place with the purpose of collecting specific environmental and archaeological data in order to estimate the potential of underwater archaeological remains and to determine the prospects of an underwater intervention. This survey identified several structures located underwater or in direct connection with the lake shore, indicating the necessity for further fieldwork. These future operations are to be developed in a specific framework which motivates the elaboration of a precise methodology adapted to the particular context of dam archaeology.

Title: An Investigation into the Absence of Classical Greek Triremes in the Archaeological Record and the Paradox of the Recent Finds in the Egadi Islands

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It is 2.500 years since the Battle of Salamis (480 BCE), when the alliance of Greek city states defeated the Persian Empire at sea. This pivotal victory, largely due to Athens and her fleet, "supercharged" the fledgling Athenian democracy and had profound consequences. However, this is the story of the "triremes", the three-banked warships, which duelled in the battle. They were designed for speed and manoeuvrability and fitted with bronze rams. As "ship-killers" they were a revolution in naval warfare.

They were invented in the late eighth century to middle of the seventh century BCE and were popular until the Hellenistic period when they were superseded by larger warships. They last fought in 323 BCE. However, despite this long history, and many thousands being built (and lost), no trireme wrecks have been found. This paper seeks to answer the reason for this. Many scholars agree that rammed triremes flounder rather than sink, based on the texts of ancient historians. Scholars mistakenly equate being fast with being light, and that rammed triremes floated because they did not carry ballast. I argue that there is little evidence to support this notion.

Recent finds of artefacts and several dozen bronze rams from the Battle of the Egadi Islands (241 BCE), off Sicily, demonstrate that ancient warships did sink. The Phoenicians were heavily laden to resupply their troops and were fighting in rough seas. This paper proposes that these conditions, either alone or in combination, meant that rammed warships sank to the seabed. The hull degraded over time leaving only the bronze artefacts. I propose an approach to target investigations of sea battles where there were similar conditions, and where any rammed warships had the least chance of being recovered at the time of the battle and consequently their remains could be found now.

Title: An Archaeology of the Homeric Sirens and Maritime Navigation in the Graeco-Roman World

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This paper situates the Homeric Sirens at the heart of a larger discussion of how myth was informed by, and in turn mediated experiences of seafaring in the Graeco-Roman world, and aims to trace this connection in the archaeological record. It outlines the principles of ancient navigation in the Mediterranean and offers a new interpretation of the Siren episode in Homer's *Odyssey* that suggests the Sirens are a mythic manifestation of hazards at sea. Homeric geography places the Sirens at points of convergence in the sea lane along the Tyrrhenian coast of Southern Italy, where narrative and physical geographies manifest in the ritual landscape. The existence of Siren cults cannot be separated from Greek expansion westwards and the historical importance of the port cities of Magna Graecia. An overview of Sirens in the iconographic record to examine the functions of the Siren symbol in the Graeco-Roman mind is undertaken.

The methodology is inspired by the maritime cultural landscape approach. This framework was chosen in order to bring together sources of tangible and intangible evidence. The first stage reconstructed ancient seascapes in locations traditionally associated with the Sirens. These passages are characterised by narrow channels, high cliffs, wind, and currents that are often unpredictable and make the ship more vulnerable to shipwreck. The shipwreck record was then overlaid to draw parallels between myth, landscape, and archaeological evidence for trouble at sea. Ultimately, this paper demonstrates how the Homeric Sirens can be understood as a dynamic cognitive agent within the maritime cultural landscape.

Title: Fortuitous Shipwrecks in a Mare Incognitum? An Integrated Analysis of Late Roman Pontic Cargoes in Fourni Archipelago (Aegean)

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This paper examines three shipwrecks that have been documented in Eastern Central Aegean – Fourni archipelago, dating to the Late Roman period. Preliminary observations and typological study of the raised samples indicate a Pontic provenance for the majority of the amphorae, with a minority presence of Eastern Mediterranean types within the assemblages. Despite the initial stage of investigations, many details have already emerged via macroscopic observations on fabrics, while thin-section analyses of the archaeological material are shedding light on the delicate matter of Black Sea manufacture centres. As one of the shipwrecks is a candidate for excavation in the foreseeable future, GIS and 3D technology is applied for its intra-site study. The significance of these shipwrecks lies particularly in their uniqueness, as they constitute the only known Pontic consignments of this kind to be found in the Mediterranean. Even though the distributed archaeological evidence testifies the existence of trade between the Black Sea territories and the Mediterranean during the period under examination, an overall synthesis is missing. Taking as a starting point the shipwrecks of Fourni, the present study aims to analyse and reevaluate, by using amphorae as key evidence, the size of trade, its patterns, and the tradable commodities exported from the Black Sea towards the Aegean and far beyond in the Late Antiquity.

Title: A Lost Cargo: An Archaeological Study of a Late Roman Merchant Ship in the Western Black Sea

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This paper focuses on the ceramic remains associated with the cargo of a Late Roman trading vessel, discovered wrecked off the coast of Bulgaria by the Black Sea Maritime Archaeology Project (BSMAP) in 2017. Submerged at a depth of 95 m, the remains of the previously undisturbed wreck, identified as 'BSMAP_2017_WRECK_008' or 'Sinemorets A', are analysed using high-resolution georeferenced photography, retrieved using state-of-the-art ROV systems. In analysis of this digitalised survey, this paper adds to a growing body of literature regarding the employment of digital humanities techniques in the remote investigation of deep-water archaeological sites.

Dating from the early 4th century AD, the 'Sinemorets A' wreck is arguably the most comprehensive assemblage of a late Roman trading vessel yet discovered outside of the Mediterranean. Through comparative analysis of the c. 81 ceramic artefacts associated with a decked structure in the fore of the wreck, this paper investigates the 'lost cargo' of this trading vessel. By analysing this ceramic cargo, their origin of production and likely contents, this study further explores the potential of the ship's 'lost cargo' by questioning the apparent absence of further marketable products within the wreck. The aim is to contextualise the remains of this significant archaeological discovery, drawing from it further understanding of the maritime trade systems that functioned between the major seas of the Eastern Roman Empire: the Mediterranean and Black Sea.

Title: After Wrecking: Examining 17th and 18th Century Spanish Salvage of the 1622, 1715, and 1733 Spanish Plate Fleets

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From the 16th to the 18th centuries, Spain dominated the transatlantic trading empire, though not without cost. As fleets departed Havana, Cuba, for their voyage back to Spain, they faced many dangers. The greatest danger were unexpected tropical storms and hurricanes. As a result of such storms, Spain suffered three massive fleet destructions in 1622, 1715, and 1733. Since the loss of even one galleon could impact Spain's economy, Spanish-American authorities established permanent salvage teams equipped with vessels at principal ports throughout the Caribbean to administer aid to survivors and recover lost cargoes. Salvaging and repairing floundered galleons became essential in maintaining Spain's financial lifeline. These salvage operations continued seasonally for several years after the initial wreckings, and produced an extensive historical record. Despite the well-documented history of the fleets, little research has focused on the salvage camps, the methods used to recover submerged cargo, and the enslaved Indigenous and African free divers who conducted the salvage operations. Working under a feminist perspective and maritime cultural landscape framework, this research seeks to extrapolate information pertaining to the Spanish-American salvage industry by examining the material culture and vessel type implemented in the salvaging process, as well as uncovering the untold stories of the individuals participating in the salvage operations. Ultimately, this research seeks to contribute to the study of 18th century Spanish colonialism and commerce by examining the lives of the salvagers to reveal the networks between these individuals and the global colonial landscape.

Title: Shipwrecks and Salvage of Sunken Cargoes in the Caribbean Sea (16th to 18th Centuries) and an Overview of Breton Involvement in this Maritime Area

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A large collection of historical archives held at the Department of Underwater Archaeological Research (DRASSM) was analysed in order to set up their impact in assessing archaeological potential areas. A preliminary study shows a great list of shipwrecks scattered mostly in the Atlantic Ocean from the modern period. This data is not exhaustive for all the shipwrecks that occurred in the Caribbean area, but it provides essential information for understanding the hazard zones, the problems encountered by the ships and their crews, the conditions of navigation, the dangers, and the conditions of loss. The study provides information about technical and human aspects of recovering cargoes practices in the modern era. The Breton insured ships chartered and sold to Spain, as well as slave traders, corsairs, and ships built in Breton's shipyard that sailed there. The selective manufactured goods, mainly textiles and expensive cloth, that circulated in the market through the main ports of Caribbean area were mainly originally from Brittany and Rouen.

Title: The Brouwershavense Gat 2 wreck (BHG 2): Trading and Recycling of Worn Cast-Iron Cannons in the 18th Century

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In this paper the case-study of the BHG 2 wreck is extensively investigated regarding what it can tell us about the trading possibilities for scrap metal, such as worn cast-iron cannons, in the 18th century. The main source for this work is the unpublished diving reports that resulted from a survey performed in August 2003. This gathered information will be enriched by means of personal insights from reviewing the reports and inspiration gathered from the methodology used in other published works. The remains on the wreck site are discussed by material category and possible hypotheses, or explanations for the presence and purpose of the artefacts are formulated. The wreckage was found to be in a rather poor condition of preservation, and it was mainly characterised by the abundant presence of cannons, cannon fragments, and ammunition. While it can be stated with certainty that the cannons were present on the ship as cargo due to their neatly stacked formation, it could not be determined with certainty for what specific trade they were meant for. The possibilities were narrowed down to either arms dealing, which means selling the complete cannons and ammunition for reuse as artillery or selling the cargo as scrap metal to remelt and recycle the iron.

Title: "That would be enough": Creating a Framework of Assessing Value During the Battle of Yorktown, 1781, Through a Material Culture Analysis of *Betsy*

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By the time General Charles Cornwallis surrendered at Yorktown in October 1781, the majority of his coveted shipping fleet lay abandoned at the bottom of the York River. In 1978, the Yorktown Shipwreck Archaeological Project was launched with the intention of surveying several of these wrecks. The project included a full excavation of *Betsy,* a chartered victualler scuttled during the Siege of Yorktown to protect the town from an American amphibious assault. By utilizing primary resource material such as ships' manifests, correspondence, and supply reports, this paper will create an evaluative framework to determine what materials were most in demand during the Battle of Yorktown. This framework will then be applied to the remaining material culture of *Betsy* as a case study in determining the extent to which all valuable materials were removed from *Betsy* prior to its scuttling. While it is unknown as to when Cornwallis gave the order to scuttle *Betsy*, presence of higher value items (established by the aforementioned framework) may indicate a shorter period of time to prepare. In addition, the framework can be applied to evaluating the selection of *Betsy* to be scuttled, as opposed to another ship. The combined potential for this framework presents valuable information on the largely understudied strategy of scuttling that the British utilized multiple times during the American Revolutionary War. With Great Britain at the brink of establishing its global empire, this material culture analytical framework will set a precedent in understanding British material value during overseas conflicts at the turn of the 19th century.

Title: She Searched for Seychelle on the Seashore: Archaeological and Historical Investigation of a Mid-19th Century Whaling Schooner

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The American whaling industry caught its final wind during the turn of the twentieth century following the discovery of petroleum in 1859. As a result of decreasing profits, American whaling operations responded with modified hunting strategy and target fishing grounds, as well as changes in vessel construction and usage. This adaptive approach for self-preservation brought about a greater frequency in "plum-pudding" whaling, short-term voyages in the Atlantic typically carried out in smaller schooners. Named for their ability to easily restock coveted supplies and "indulgences," Massachusetts-based plum-pudding whaling expeditions brought an influx of New Bedford and Provincetown schooners southward to the Hatteras and Charleston whaling grounds. In North Carolina, whalers took advantage of calm seas, a shore-based whaling industry in Shackleford Banks, and a bountiful stock from the nearby gulf stream. *Seychelle,* a 47-ton, double-masted whaling schooner owned by E.& E.K. Cook & Co. out of Provincetown, was one such schooner that wrecked at Cape Lookout, NC on its first voyage to the Hatteras Grounds. During East Carolina University's 2021 Programme in Maritime Studies Summer Field School, the suspected remnants of *Seychelle* were investigated through extensive survey, metal detection, and photogrammetry, building upon prior archaeological efforts from 1982 and 1993. This paper aims to produce a vessel biography of *Seychelle*, depicting its usage prior to and during the decline of American whaling, while assessing whether its suspected remains could in fact belong to a vessel of this construction.

Title: Microbiologically Influenced Corrosion: An Interdisciplinary Approach to the Management of Submerged World War II Aircraft Wrecks

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As technology improves, the ability to locate underwater cultural heritage sites has grown exponentially. However, the field of maritime archaeology cannot lose sight of its responsibility in assisting with the stewardship of sites previously documented. In marine environments, corrosion poses the greatest threat to metallic material culture. The corrosive processes that jeopardizes in situ preservation cannot be understood solely using archaeological methods. To properly confront corrosion in the name of site management, one must take an interdisciplinary approach that incorporates knowledge from fields such as electrochemistry and microbiology. Recently, "microbiologically influenced corrosion" (MIC) and its effect on the deterioration of iron-based shipwrecks, has become a fruitful area of research within maritime archaeology. Until now, the same efforts have not been extended to submerged historic aircraft, such as the aluminum plane wrecks of WWII. This paper will describe a Hawaii-based study, in which biofilm samples taken from four submerged WWII-era aircraft were subjected to DNA sequencing. The resulting taxonomic data was used to make inferences about the ecological relationships and microbial spatial distribution that may enable MIC. The biofilm microbiomes were compared to those of water and sediment samples in hopes of discerning the effect that the surrounding environment has on the wrecks' microbiome and vice versa. Detailed 3D photogrammetric models and orthographic plans of the aircraft were created, which serve as a visual baseline to be paired with the microbial data. The project serves as an example of successfully integrating several disciplines in the management of underwater archaeological sites.

Title: Historic Shipwrecks and the Impacts of Climate Change

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Much of what once was considered stable about ocean chemistry and physical oceanography is now known to be shifting because of climate change. The world is seeing rising water temperatures and sea levels, shifting global currents, and increased weather volatility. The pH (or acidity) of the ocean is changing - as is salinity. In the UK, heritage agencies have begun to define what they believe to be the greatest risks. These include the spread of invasive species in warming seas; changes in sediment supply due to changes in coastline, tidal flows and bottom currents; increased disturbance of intertidal and near shore heritage assets during amplified storm events; and increased ocean acidification causing enhanced rates of corrosion for iron and steel shipwrecks.

The continuation of these trends is already forecast, but the thresholds of change for significant impact on coastal and submerged heritage assets are less well-defined. To identify those thresholds is one of the objectives of the ongoing PhD research programme. It includes a world-wide practitioners' survey identifying priorities for research – the results of which will be reported upon in this presentation.

The presentation will also show interim results of intertidal surveys of 18 shipwrecks sites around the coast of Wales. These sites have begun to be impacted by erosion as the result of severe storm events resulting from climate change.

Title: Black Sea Wreck Virtual Reconstruction to Reinvigorate Archaeological Data and Comparative Studies

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This paper aims to study a wreck found by the University of Southampton -Black Sea MAP Project- through the usage of virtual reconstructions. There has been a big boom of historic virtual models for public engagement and entertainment. Their usage in research has been much slower due to issues with resolution, sources, liability, etc.

This paper proposes and tests a straightforward and repeatable methodology for creating detailed virtual reconstructions where the model will be used as a scientific container of the reconstruction information and parameters, including, therefore, the 3-dimensions into the archaeological documentation.

The methodology starts with the virtual modelling of the reconstruction of the Black Sea wreck, based on a photogrammetry survey of the remains, to how it hypothetically would have looked prior to sinking. To this "shell", information used for the reconstruction is then added, showing the sources and limitations (metadata and paradata), which are linked to the model using the principles of the BIM models, the Extended Matrix and the Graphic Scale of Evidence.

The result of this project has been beneficial beyond the academic aspect of archaeology. The creation of a hypothetical reconstruction has enabled us to open a new spectrum of questions and challenges and increase our archaeological and historical knowledge on the ship and its community such as chronology, building, propulsion, usage of the ship. It has also confirmed the usability of this reconstruction as a public engagement tool that shows the scientific background of the archaeological discipline.

Poster Abstracts

Title: The diffusion of North African and Hispanic amphorae in the Aegean Sea: The evidence of shipwrecks

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This paper examines five underwater wreck sites that have been documented during the underwater archaeological surveys in the South Euboean Gulf (2006-2013) and in the Fourni archipelago in the Eastern Aegean (2015-2018). Some of these sites are interpreted as shipwrecks, while others as part of concentrations of material or rejected cargoes, and they can all be dated between the early 2nd and the mid-3rd centuries AD. The ceramic assemblages of the four Euboean sites, generally characterised by a heterogeneous amphorae cargo, indicate a North African provenance. On the other hand, the study of some rare specimens has not yet revealed a certain source of production, nor a definite typological identity. Nevertheless, the discovered sites constitute the first well- documented evidence of North African amphorae as part of shipwreck cargoes in the Aegean Sea. Evidence from land sites confirm the presence of North African amphorae, but the ceramic assemblages from terrestrial excavations show a very limited and dispersed distribution of these amphorae, at least until the 4th century AD. An element of imponderability is the absence until recently of an exhaustive study of North African amphorae in Greece. The ceramic material of the Fourni site is homogeneous and indicates the presence of an amphora type of Hispanic origin documented for the first time in the Aegean. The preliminary state of the research, and the general lack of evidence from both underwater and terrestrial sites allow only a limited discussion of the circulation of Hispanic amphorae in the Aegean, but allow us to pose a number of questions. With the above-mentioned evidence being the primary archaeological source, the present work aims to examine and re-evaluate, through ceramological and archaeometrical study, the distribution and commercialization of North African and Hispanic amphorae in the Aegean Sea during the first centuries of the Roman Empire.

Title: The Archaeological and Geomorphological Research in the Ancient Coastal City of Nora (Sardinia, Italy)

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In 2011 the Department of Cultural Heritage of the University of Padua activated the project "Nora and the Sea" in order to reconstruct the coastal layout of the ancient city of Nora (CA). In particular, the spatial and functional relationship between the archaeological site and its surrounding maritime space and the extent of the sea level rise were examined. Today as in the past, sea level variation, together with the destructive coastal process of erosion, still threaten and shape the shoreline, forcing the city to adapt. The archaeological investigation was based on several data derived from the study of published material and previous research, cartography and aerial images of the last century, drone photogrammetry, the reconstruction of the bathymetry of the seabed through echosounder and manual relief and finally from direct underwater exploration by surveying and recording all the submerged structures. The final result was the development of a GIS platform handling the digital model of the land and the seabed and the estimates of SLR (sea level rise) for the ancient age. A new phase of the project is currently being carried out, mainly focusing on the geomorphological approach. Such research reinforces the multidisciplinary approach and underlines the need to realise a campaign of core samplings to understand the palaeosettlement and the palaeoenvironmental dynamics. In addition to this, the cores could be a useful tool in order to shed light on the harbour of the ancient city, which still today remains an unsolved question.

Title: Plytra: A submerged Harbour Site in Laconia (South Peloponnese, Greece)

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This poster explores the archaeological site of Plytra. The first to refer to this site was Pausanias. Archaeological investigations have taken place trying to answer, amongst others, questions such as whether the site was indeed the ancient town of Asopos (which declined after the earthquake of 375 AD) and whether a port ever existed. Asopos, as a thriving Roman community with intense religious and commercial life, seems to have affected the land and sea trade, by even Eastern influences. The ports of the southern Peloponnese, and especially the archaeological site of Plytra, seem to have played an important role in the distribution of products.

Was the archaeological site of Plytra the ancient Asopos? What was the role of the quarries? Can we discuss the existence of a port in the archaeological site, and generally about primary and secondary harbours in the Southern Peloponnese? How the rise of sea level, the geotectonic actions, the geological changes, the coastal erosion with the weather conditions and human intervention, have affected the archaeological site? And finally, what was the development of the site during the Hellenistic, Roman, and Byzantine period? In order to answer all these questions, research in the nearby quarries and a comparison with other documented harbours in the southern Peloponnese seem to give some evidence. The preliminary results of this research offer a broader understanding of this interesting archaeological site.

Title: Crossings of the Sambre: An Archaeological Map of the River in Belgium

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In 2013, the Belgian parliament ratified the 2001 Convention on the Protection of Underwater Cultural Heritage of the UNESCO. This poster presents the work conducted in the framework of the Master's dissertation which contributed to the development of underwater archaeology in Belgium. The Sambre River flows through France and Belgium. The study focused on the second part between the border and its confluence with the Meuse River at Namur. The Belgian part of the Sambre was canalised in the 19th and 20th centuries. Its length was reduced from 103 km to 87.6 km. First, a restitution of its initial length (103 km long) was undertaken. A methodology for this restitution was developed based on a Geographic Information System (GIS) and on the comparison of old and current maps. Then, the crossings (fords, bridges, and ferries) indicated on old military maps from the 17th to the 20th centuries were placed on the proposed restitution. This archaeological map will help researchers and the Belgian State to protect their underwater heritage.

Title: Study of Cod Reserves from the La Hougue Battle Shipwrecks (1692) Through Ichthyofauna Remains: Supply and Food Aboard

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In 1692, in the context of the Nine Years War (1689-1697), Admiral Tourville's French fleet faced the Anglo-Dutch alliance along the Norman coast. Five large French men-of-war were reduced to ashes close to Tatihou island in St-Vaast-La Hougue bay (Manche Department, France). Discovered in 1985, these shipwrecks have been excavated from 1990 to 1995 by Michel L'Hour and Élisabeth Veyrat, from the Département des Recherches Archéologiques Subaquatiques et Sous-Marines (DRASSM, Ministry of Culture). Among the numerous remains, fish bones were found in large quantities on one of the wrecks. Preliminary studies conducted between 1990 and 1992 by Myriam Sternberg determined that the fish remains were cod (Gadus morhua) which were reserved for food aboard. The data recovery during the year 2020-2021 allowed the acquisition of new knowledge on the loading and the process carried out on this fish. Sediment samples were collected and sieved with 1 mm mesh during the excavations. Studied during this year, they have allowed the discovery of small fishes and small objects. In addition to the archaeological material, various written sources could be attached to the study, such as archives, treaties or royal ordinances, to further the knowledge on the organisation of supply and consumption. This ichthyological study is a new approach for underwater archaeology and provides unpublished information on the crew's on-board food for the modern period.

Title: The Greek Dark Ages and the Early Routes: An Archaeological Survey in the Aegean and the Eastern and Western Mediterranean Triangle

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In roughly 1200 BCE, after the catastrophic Mycenaean collapse, the Greek World came into a chaotic period for which we know almost nothing about its political structure. No trace of social stratification has been observed, but we know there was a drastic decline in population and craftsmanship scale, and the surviving communities led an isolated life. This period, when contacts with the East were interrupted and not only did Linear B script, but all written cultures disappear, is dated approximately to 1200 BCE - 800 BCE called "the Dark Ages". What caused the collapse still remains uncertain. However, climate change, drought and the resulting famine, earthquakes, invasions and internal rebellions are considered to be the most likely causes. Whatever the cause, the collapse was huge, and not until the 8th century BCE did the Greek World revive. Undoubtedly, the early routes used by the Greeks, and most importantly their ability to turn what they confronted in the tough conditions of the Dark Ages into opportunity, were vital in reaching the colonization period that paved the way for the flourishing Classical times. This poster deals briefly with the concept of the Dark Ages and its impact on the Greek World based on archaeological evidence and hypotheses. Focusing on the triangle formed by the Aegean and the Eastern and Western Mediterranean, the poster is intended to lift the smoke curtain obscuring the bridge connecting the Late Bronze Age, whose maritime routes interconnected many communities, and the 8th century BCE, which some scholars have described as a revolution.

Title: Maritime Risks in Martinique From 1635 to 1815

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The West Indies are experiencing a revival of interest, yet underwater archaeology in Martinique still needs to be developed. The research project which this poster presents is part of this effort. Shipwrecks, although marginal, are inherent to maritime space and have multiple consequences on coastal societies. They are apprehended here as witnesses to the island's underwater archaeological potential, from the establishment of the colonial administration to the Restoration in 1815. This work is in parallel with the thesis on Guadeloupe by Jean-Sébastien Guibert. It includes some specific features of Martinique, particularly concerning the maritime traffic of the island (transatlantic commercial traffic and military traffic) and its central place in the geopolitical stakes of the colonial world. The risks leading to shipwrecks are numerous, both natural and human-made, but the colonial society of Martinique and the metropolis have taken many steps to counter them. Archival records of losses at sea help us to understand the risks to which ships are subjected. After an overview of the research and a bibliographical study, the next step of the work in the archives (ANOM, CCI Marseille and others) will aim to give a global and exhaustive overview of the risks faced by the various vessels on the Martinique coast.

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Maritime Archaeology Graduate Symposium

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