Maritime Archaeology Graduate Symposium (MAGS)

Books of Abstracts

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Piracy in the Hellenistic Period: A Misunderstood Phenomenon

Joseph Pacheco

The first decades of the 1st century BCE were a particularly troubling time for the Roman Republic. Civil wars and pernicious enemies such as Sertorius and Mithridates VI threatened to overwhelm the once invincible Roman state. Ancient authors assert that one of the most dangerous enemies of the Republic in this period was in fact the Cilician pirates, a group of polyglot, multi-ethnic, and socially stratified freebooters who were able to bring chaos and destruction right to Rome's doorstep and who were feared throughout the Mediterranean. Indeed, the pirates were able to operate at will and interdict the all-important Roman grain trade. They even burnt a Roman merchant fleet docked at Ostia itself. While much was written about the Cilician pirates by a myriad of Roman and Greek authors, they are still not fully understood by modern scholarship. For instance, not much is usually made of the fact that, for decades, the pirates and Rome (as well as other Hellenistic powers) had a beneficial and largely peaceful relationship. This presentation will first explore the mutually advantageous commercial arrangement the Cilician pirates and Romans shared: where the pirates traded slaves indirectly for wine and other goods via the emporium at Delos before 100 BCE. Next, the significant role pirates played as mercenaries in Hellenistic militaries will be analyzed in the wider context of widespread mercenary use during the Hellenistic period to ultimately show that Hellenistic pirates were as useful as friends as they were dangerous as foes.

A Comparative Structural Analysis of Shell-first and Frame-based Ship Hulls of the 1st Millennium AD

Nathan Helfman

The 1st millennium AD experienced significant change in ship construction. A slow transition evolved where ships built 'shell-first' were supplanted by 'frame-based' ships. Shell-first ships were constructed with strakes edge-jointed using pegged and later unpegged mortise-and-tenons joints, dowels or coaks, and at times, sewing, resulting in a strong and rigid hull. The strakes were then fitted with transverse frames independent of the keel. Frame-based ships were characterized by transverse frames fixed to the keel and reinforced by longitudinal components. The hull planks were later fastened to the pre-existing frames. The objective of this study was to examine whether mechanical factors contributed to the transition in ship construction. An initial comparative linear static FEA global comparison analysis was conducted on CAD models reconstructed from two archaeological shipwreck findings: Ma'agan Mikhael (400 BC) and Dor 2001/1 (6th century AD). The Ma'agan Mikhael shipwreck was representative of the shell-first technique and the Dor 2001/1 shipwreck represented the frame-based technique . Standard global stillwater criteria revealed that both ships possessed high degrees of rigidity and low von Mises stress values. Further analyses were performed on two symmetrically identical archetypal quarter hulls while varying load and construction parameters. In all the archetypal load scenarios, the shell-first samples exhibited higher rigidity and less extreme von Mises stress differences than the frame-based samples. Frame-based rigidity and stress levels were directly dependent on the number of frames added to the structure. Further to be researched are the economic, engineering, social and ecological issues factors which contributed to the transition.

The Mazarrón boats: Eastern Mediterranean Phoenician vessels? or evidence of an indigenous tradition of sewn-plank boats in the Ibe`rian Peninsula?

Carlos Cabrera Tejedor

Two Iron Age shipwrecks, associated with abundant ceramics of Phoenician origin, were discovered at the *Playa de la Isla* in Mazarrón, Spain. This paper will discuss the presence of mixed shipbuilding techniques and hitherto unknown boat building features documented on the Mazarrón 1 hull remains. The cargo of the Mazarrón 2 boat suggests that this boat was part of a commercial enterprise supervised by a Phoenician colony in the Iberian Peninsula. However, there is evidence to suggest an indigenous shipwright from the Iberian Peninsula built the Mazarrón 1 boat. Although he had knowledge of shipbuilding innovations introduced by the Phoenicians (i.e. pegged mortise-and-tenon joints), he retained traces of his own shipbuilding traditions in the construction of the hull. Through a comparative study of analogous wrecks, the paper will further argue that the hull of Mazarrón 1 presents hybrid shipbuilding techniques potentially representing an intermediate stage in a transition from an indigenous tradition of sewn-plank boats to the assimilation of pegged mortise-and-tenon joints. For all of the above, the hull of Mazarrón 1 represents an important source of information for increasing our understanding of ancient shipbuilding, and its development, during the Iron Age.

Pirates in Space: Using Satellite Archaeology to detect the remains of Greco-Roman Piracy

Adam Dawson

As part of the Maritime Archaeology Graduate Symposium, I would like to present the research I undertook over the summer as part of an eight-week placement at the UK Satellite Applications Catapult. The project involved using remote sensing and GIS to find and locate archaeological sites related to Cilician piracy in the Late-Republic-Early-Imperial era. Although they are typically portrayed as a major power in the Eastern Mediterranean prior to Pompey's invasion, very little is known about the nature and structure of Cilician pirates. This is further confused by the fact that the term "Cilician" in the Roman era appears to refer to a number of groups from numerous geographic locations throughout the Mediterranean, ranging from the Balearic Islands near Spain, all the way to the easternmost points of Turkey. On top of this all primary regarding the Cilicians were written by Roman authors, which leads to a large amount of bias. As a result of all these points, archaeological research is vital for both understanding the geographic Cilicians and distinguishing them from other non-roman maritime powers at the time. As part of my placement I used a mixture of satellite imagery and GIS to create a system which showed areas most likely to be associated with Greco-Roman piracy. Several of the areas were then examined in closer detail and revealed archaeologicals sites which were either under-researched or completely unknown academically. This research also helped me form a loose typology for Cilician coastal sites in Southern Turkey and create a semi-autonomous system for the identification of archaeological sites. The results I found, how I devised this system and the impact this could have of research into Greco-Roman piracy, are all points I would like to discuss in this conference.

It's the Pits: Stable Isotope Analysis of 4th Century BCE Mazotos shipwreck olive stones

Elizabeth Briggs

The frequent preservation of organic remains is a unique aspect of underwater archaeology. Can stable isotope analysis be used on these remains to determine their geographic origin, thus illuminating aspects of the ships' journey? Carbon stable isotope analysis is conducted on 13 waterlogged olive stones recovered from the

4th century B.C.E. Mazotos shipwreck, Cyprus, 20 charred olive stones from the Hellenistic farmhouse at Tria Platania, Greece, 10 charred olive stones from a Hellenistic tavern at Corinth, Greece, and 20 modern olive stones from Chios, Greece. Through analysis of these results, the possibility of determining the geographic origin of the Mazotos olive stones is assessed. Further implications for our understanding of amphorae use and the trade in whole olives in the ancient Mediterranean is explored. Results are suggestive of multiple geographic origins for the Mazotos olive stones.

B*efore Thalassocracies: Reconstructing the Cycladic Longboat and Rethinking its Use and Social Implications in the Early Bronze Age Aegean*

Panos Tzovaras

Due to island's biogeography impact, there is a misconception about the myth of primitive isolate and insular island communities, burdened by the vast sea. However, the archaeological record paints a different picture, per which the sea, whilst a burden, could also act as connecting bridge. Thereby, on islandscapes and especially on clusters of islands, it is common that not only isolation, but interaction may be increased to an extreme.
Cyclades and shipbuilding tradition that emerged there make a good example of the aforementioned notion, considering the obsidian, found at the Franchthi cave, transported from the island of Melos during the 11th millennium.

However, the proliferation of seafaring and shipbuilding activity is attested much later, during the Final Neolithic (FN, 4200-3200 BC), based on indirect evidence such as island colonisations and the Aegean metallurgy. Consequently, these led to major changes in society, technology and economy, during the Early Bronze Age I-II (EBA I-II, 3200-3300) periods, and more specifically during EBA II, corresponding to the Keros-Syros culture. Luckily, apart from the indirect, there is various direct evidence exemplifying the use of a seaworthy type of watercraft, deriving from the preserved outlines of logboats in watery environments, the Aegean iconography and three-dimensional representations.

It is at this context that the Cycladic longboat emerged, leading Renfrew to write about the long-range contacts of the Aegean seafarers and therefore the phenomenon of the international spirit. Thereby, some of the specialised Cycladic centres emerged and managed to control and monopolise the local and perhaps the interregional maritime trade, by exploiting their shipbuilding prowess. Although, indisputably the pinnacle of the FN-EBA technological achievement, the Cycladic longboat, gets the lion's share in the fomation of a Cycladic Thalossocracy, some questions might arise. Was this the lone reason? Was the use of the longboat devoted only to trade and moreover could be used for it? Were the islanders renowned pirates as Thucydides (Istoriai 1.5.2) mentions and was the longboat the medium for that? To answer these questions, we should attempt to reconstruct it by combining direct with indirect evidences and ethnographic parallels, and test it by using the Rhinoceros and Orca 3D software, to grasp the wider picture, define its pros and cons and possible uses as well as its significance to the EBA communities.

Turn the Sea into Dry Land: Exploring hominin movement patterns in the Lower Palaeolithic Aegean 'dry land': methodological challenges

Peny Tsakanikou

The Aegean 'dry land' hypothesis is increasingly gaining ground in the discussion for the Lower Palaeolithic hominin dispersals. The now submerged landscape holds important information about paleoclimate and paleoenvironment, such as natural resource availability and variability, but also about cultural aspects, such as hominin movement patterns and landscape use, during the Lower and early Middle Pleistocene. However, the Aegean is a highly dynamic region that provides only few windows of opportunity for studying systematically the Lower Palaeolithic evidence. The main question that I will explore, is to what extent can we 'unlock' this information using modern technologies in order to (a) understand the archaeological and palaeoanthropological implications for the Aegean and the wider eastern and northeastern Mediterranean, and (b) produce possible scenarios of hominin movement and occupation.

Topographic roughness (complex topography concept) and edaphics (soil analysis) offer a rigorous methodological approach that will be tested for the first time in the Aegean region. These methodologies are based on modern datasets, helping us to overcome some of the main problems inherent in the available evidence for the Lower-Middle Pleistocene Aegean (i.e. fragmentation and paucity of data and coarse resolution).

Mapping the topographic roughness within the Aegean, presents various methodological challenges that will be discussed here, in relation to advances and limitations of GIS applications (spatial analysis), and conventions adopted in resolution. Some basic patterns are starting to emerge, permitting us to discuss further some initial ideas that will set the pace for our future work.

Late Bronze Age Eastern Mediterranean Seafarers and Seafaring

Peter N Fiske

Seafarers were key to Late Bronze Age eastern Mediterranean maritime travel and trade, but most studies on seafaring focus on economic, technological, or political-historical subjects while neglecting daily life. Those that do focus on daily life concentrate on the Aegean rather than southern Anatolia, the Levant, and Egypt. This study employs economic sociology and social systems theory to integrate archaeological, iconographic, textual, and ethnographic evidence from case studies on Uluburun, Cape Gelidonya, Luxor, and Ugarit as other sites in order to provide context and insight into LBA eastern Mediterranean seafaring and the lives of those connected to it. It concludes that seafarers lived in a strongly hierarchical system dependent on cooperation in dangerous conditions. The sea presented opportunities, such as expanding markets and the exchange of knowledge, as well as organizational challenges and risks, from coordinating supplies and specialists to fending off theft, piracy, and warfare. To deal with these issues, seafarers depended upon group coordination, control, solidarity, and communication, which was created, maintained, and enforced through social norms, political authority, and military and economic power. This ultimately transformed social, political, and economic power relationships in the region.

The role of the sea in Roman Crete's overall prosperity. A view through the archaeological maritime context

Dimitris Karampas

Crete came under the Roman rule in the year 67 BC, and remained under the Roman supervision for at least four centuries. The island's strategic location made Crete an important province for Rome, while offering Crete a unique role in eastern Mediterranean trade and in the period's sea connections. As a result, the island's participation in the Roman trade network of eastern Mediterranean offered Cretans a range of economic and social opportunities. Certainly the island's history goes hand in hand with the seafaring and seaborne trade, which is shown via the numerous coastal sites and shipwrecks found along the Cretan shores. These, in combination with terrestrial evidence show some great changes in the local economy, architecture, technology and perhaps even in the social structure. Furthermore, the overall growth of the coastal centers during the Roman occupation, which can be seen in the archaeological record, and the abundance of Cretan amphorae discovered in various regions of the Mediterranean, constitute further evidences of Crete's trade influence. This paper examines the development that occurred in Crete under the Roman rule from the maritime perspective, while scrutinizing the representation of Roman Crete's maritime character.

Networks and Small Worlds in the Eastern Mediterranean – Maritime Connectivity in the Late Bronze Age and Archaic Period

Anja Krieger

It is generally agreed upon that ships are part of networks. It is in their inherent nature to connect places, oftentimes sea travel was easier than land travel and probably cheaper. However, placing shipwrecks within a network is more complicated. Ships can sink at any moment and at any stage of their journey. The place where a ship sinks and the place where it intended to go is not the same.

In recent years in Bronze Age scholarship more importance has been put on local or regional maritime connections which were presumably more dense and numerous than long-distance connections. These regional and local interactions have been termed small worlds. Small worlds are interaction spheres that form as aggregates of many neighboring coastal nodes. The cohesion results from habitual face-to-face interaction based on geographic proximity and various kinds of social and economic ties and have commonly shared cultural traditions. One aspect of small worlds was frequent contact: which led to strong economic and social ties, which in turn makes contact even more frequent and might thus endure through rise and fall of large-scale political and economic entities, that is survive through the Bronze Age collapse.

This paper has two aims, firstly it will present and discuss several case studies of shipwrecks in the Eastern Mediterranean region, and secondly how these case studies exemplify (or not) small worlds. It will further be attempted to clarify what might actually be a 'small world' and how they overlapped and intermingled.

Pioneers of Maritime Activity: The uses and abuses of the maritime aspects of Phoenician culture

Lamia Sassine

The Phoenicians were famously one of the most celebrated maritime populations of the ancient world. In fact, their seafaring reputation was such that this aspect of their identity has been appropriated or manipulated by many. This paper seeks to investigate the perceptions of Phoenician maritime activity, from those of their Mediterranean and Near Eastern Empires contemporaries, to those different nationalities in 19th century Europe, and the modern countries that were part of its realm. It raises the question of the importance of the maritime aspect of Phoenician identity from a Mediterranean and long-historical perspective, in terms of commerce and exchange as well as in terms of imperialism and the idea of "civilizing populations". It also addresses the question of the causes and consequences of identifying with specific cultural traits and the implications of this in terms of stereotyping and bias.

The perception of Egyptian Maritime Archaeology

Mai Ghanem

Since the beginning of the 19th century there has been a lot of activities in the field of maritime archaeology in Egypt. Boats, harbours, sculpture, ceramics, etc., have been found both in underwater and terrestrial context. However, just a few of these finds are presented to the Egyptian public by being displayed separately in some archaeological museums.

Even the Osiris exhibition, which included artefacts from underwater sites in Alexandria and have been travelling the world's museums for the past five years, did not find its way to the Egyptian community yet. The rest of the finds either remained in-situ unprotected or in the museums storages where no one can reach or study them.

Only a few people in Egypt know about Egyptian maritime, some think that there are whole intact sunken cities under the waters of Alexandria, others believe that there is only “sunken” archaeology in Egypt.

This presentation will highlight the situation of Maritime Archaeology and underwater cultural heritage in Egypt and will discuss the ideas of the presentation and preservation of such heritage.

It will also discuss the feasibility of building a Maritime Museum in Alexandria to present the Egyptian maritime heritage. Sites which are not accessible to the public can be virtually displayed. Moreover, stories can be told about sites of a major historical significance, such as the Pharos lighthouse giving the public a better appreciation and understanding of their Maritime Heritage. The museum should also introduce to the public maritime sites and objects which were found in Egypt in terrestrial context.

Cyprus Deep-Sea archaeology

Achilleas Iasonos

The radical advancement in the field of hydrocarbon exploitation in Cyprus EEZ (Exclusive Economic Zone), reveal issues of major concerns about potential acts of negligence towards UCH (Underwater Cultural Heritage). The amended national legislation of Cyprus 'Antiquities Law of 2014' *Cap.31'. (Article 18A any archaeology which is situated within the EEZ/continental shelf either known or unknown, belongs to the government (…),* exemplifies the essentiality for maritime archaeology scholars and the Department to act.

Deep-sea UCH is a sensible and dull subject, but there is an opportunity to investigate, conduct and monitor submerged archaeology, especially when geophysical (multibeam-bathymetry, seismic-data, side-scan-sonar, sub-bottom-profilers) and ROV imagery data-sets are already produced by the oil and gas companies. The following presentation demonstrates a few aspects of the PhD thesis 'Cyprus Deep-Sea archaeology'; that seeks to employ the usage of the aforementioned data-sets for the purpose of re-evaluation and holistic investigation. Wreck-sites and scatter material will be put under scrutiny so that to extract information about interconnectivity and mariteme, whilst promoting a story narrative of Cyprus, a nation that played protagonist role in the maritime affairs of the Mediterranean-Sea. The aim of the presentation is to introduce to the audience the PhD project and to illustrate the current state of deep-sea UCH. It will attempt to address some of the main question of the project such as, what are the project aims and objectives and what are the future goals. From a technical perspective, the presentation aims to provide how relevant datasets will be used and analysed and what attempts will be made to extract as much information as possible.

To conclude, the project foresees the implementation of the national legislation and seeks to employ the presence of the oil and gas companies for the purpose of investigating conducting and ultimately, monitor deep-sea underwater archaeology. Even thought, it seems to be an ambitious program the first step towards achieving this, foresees the gathering of all relevant datasets for the purpose of re-evaluation and further analysis, with the initial results to be presented at the Symposium.

The role of the maritime environment in the colonisation of Australasia, around 50,000 years ago.

E. Kiki Kuijjer, R. Helen Farr, Robert Marsh, Ivan D. Haigh

The maritime environment plays a central role in the colonisation of Australasia, around 50,000 years ago. This migration took place from Southeast Asia, and early seafarers had to cross straits and seas to reach the continent. Climatic changes around this time caused the global mean sea level to fall to around 75–80 m below the present level, exposing parts of the continental shelves of Southeast Asia and Australasia.

The archaeological record is fragmented, and there is no direct evidence of seafaring this far back in time. There is much debate on the seafaring capabilities and skills of the early colonisers. Nonetheless, it is clear that multiple sea crossings must have been made to reach Australasia, spanning considerable distances. The event is therefore important in the discussion on the peopling of world, and human behaviour. But despite the significance of the event, the nature of the colonisation process is still poorly understood. To resolve this, it is crucial to better understand how the maritime environment, especially open ocean and tidal currents, affected movement over sea. Here, dynamic effects of the maritime environment on seafaring are explored with high-resolution computer models of open ocean and coastal tidal circulation, forced with modern-day climate data. The role of open ocean currents in dispersal is explored by examining the drift trajectories of virtual particles through the velocity field of an Ocean General Circulation model. The influence of tides in the colonisation process is explored using a depth-averaged hydrodynamic model of the Australian coast. These methods provide new means of determining probable timescales and trajectories of movement through the study region.

Preliminary results show a strong but variable influence of oceanographic and tidal currents on movement to Australasia. Familiarity with these currents would have been advantageous to early the seafarers who colonised the continent.

Connecting the Dots: Neolithic mobility and maritime connectivity within the western seaways

Stephanie Blankshein

The existence of Neolithic contact and trade networks along the Atlantic façade of Britain has been demonstrated through the movement of goods and the transmission of ceramic styles, funerary architecture and ceremonial complexes. However, the frequency and extent of these networks as well as the nature of movement, both through the landscape and the seaways, has yet to be refined. Focusing on the Outer Hebrides of Scotland, this research will explore Neolithic mobility patterns within and around the western seaways through a complimentary landscape and seascape analysis. This will include utilising the extant structural record (i.e. cairns, stone circles and monoliths) to trace mobility patterns through the landscape and utilising the artefact record (i.e. the movement of stone and the transference of pottery and monument styles) to trace broader maritime networks. Eventually the transmission point, where terrestrial pathways meet maritime routes, will be identified through a desk based assessment and tested through subsequent fieldwork. Accordingly, this paper will present the results of preliminary research into Neolithic mobility patterns; firstly, the quantification of the Hebridean archaeological record and its distribution throughout the archipelago, and secondly, palaeogeographic reconstructions based on the latest Glacial Isostatic Adjustment models. Ultimately, it will be shown how this fundamental work will aid in the subsequent interpretations of Neolithic mobility patterns within the Outer Hebrides and seafaring networks along the western seaways.

Visualising Ancient Voyages: A methodological framework to reconstruct ancient voyages in the Red Sea

Zeeshan A. Shaikh

In the past, seafarers ventured beyond the horizon for a variety of reasons. In the absence of the modern compass and GPS, they encountered navigation challenges and problems that we have few clues as to how they tackled based on extant sources and data to date. In an attempt to understand how ancient navigators undertook such voyages this paper aims to present a methodological framework, a heuristic tool, to reconstruct and visualise ancient voyages essentially made before the invention of compass.

Previous works on ancient sea navigation has been more descriptive in nature resulting in a hypothetical narratives of ancient voyages (see Morton, 2001; Davis, 2009). Therefore, it is argued here that there is a need to go beyond the descriptive and hypothetical reconstruction of ancient voyages towards more analytical and empirical appreciation of ancient navigation to nuance our understanding about voyages in the past. By using a time-space framework as a methodological tool and cutting-edge spatial technology such as Google Earth 3D and GIS as a visualisation tool, this paper will endeavour, through the case study of Red Sea, to demonstrate a visualisation model of a reconstructed ancient voyage. The paper will further discuss why this methodology is apt as an approach to study ancient voyages and how it will contribute towards enhancing the scope of the discipline of maritime archaeology.

MORTON, J. (2001) *The Role of Physical Environment in Ancient Greek Seafaring*. Brill: Leiden.

DAVIS, L. D. (2009) *Commercial Navigation in the Greek and Roman World*. Unpublished PhD Thesis. The University of Texas at Austin.

Study of the port system of the coast of Almeria from the analysis of the maritime cultural landscape, VIII - XII AD centuries.

Marta del Mastro Ochoa

The study of the maritime cultural landscape of a medieval port system requires a multidisciplinary approach. It implies not only an extensive theoretical knowledge about the area and the chronological framework of study, but also the understanding of the object of study as a maritime culture, with the nautical perspective that this requires.

This conference, framed in the developing unpublished master project «Study of the port system of the coast of Almeria from the analysis of the maritime cultural landscape, ss. VIII - XII d.C », we'll explain some concepts for the study of maritime cultural landscape, and some of the elements that were part of the port system of Almeria in medieval times. These elements have been identified through an analysis of a mosaic of sources: written, iconography, cartography, and archaeology remains. These sources have been studied with a diachronic perspective, in order to understand why was this landscape so useful to be the main port of south Al-Andalus, in caliphal and taifas times. The project includes a main part of space analysis, which were developed through geographic information systems (GIS). In order to response our questions, we used visibility and accessibility analysis, which provided us with some interesting data, demonstrating that geographic information systems are useful tool also in maritime contexts.

Initial Assessment of Using Ultra-Short Baseline Acoustic Equipment for the Acquisition of Positional Accuracy in Underwater Photogrammetric Surveys

Matthew H. Thompson

The use of underwater acoustics for the detection and imaging of submerged cultural resources represents an evolution in both technological innovation and scientific methodology. For decades, maritime archaeologists have relied on underwater acoustic devices for data collection of submerged sites from shallow coastal waters to extreme depths that are beyond human diving capability. Instruments such as side scan sonar, sector scanning sonar, and multibeam sonar are commonplace on maritime archaeological projects, and the processed data is essential for detection and identification. As acoustic technology continues to evolve at increased rapidity, the maritime archaeology field will benefit from enhanced data accuracy and the manner in which that data can be applied to serve both public and private sector interests. This research project employed a specific type of acoustic ranging equipment commonly referred to as an ultra-short baseline (USBL) system to acquire global positioning coordinates of ground control targets during underwater photogrammetric surveys. The objective was to develop a methodology that would allow maritime archaeologists, and researchers in related disciplines, the capability to geo-reference underwater three-dimensional models with minimal equipment. In addition to supplementing photogrammetric surveys, the same methodology and equipment can be applied to other forms of underwater data collection when three-dimensional modeling is not applicable, and also employed in marine environments that limit the use of

towed acoustic sensors. The presentation includes a brief history of underwater acoustics, oceanographic data pertaining to sound propagation in water, and initial project fieldwork of a known wreck site in the Florida Keys National Marine Sanctuary near Key Largo, Florida.

Experimental Archaeology and the Contributory Reconstruction of a Roman Warship

Mateusz Polakowski

Rowed warships played pivotal roles throughout the Mediterranean basin yet their construction, development, and classification remain uncertain. Experimental ship reconstruction has become common practice in the search to understand and appreciate the ships that once sailed the wine dark sea. The mid-3rd century B.C. Egadi rams have revealed a wealth of new information about three-finned rams, which in turn have the potential to yield new insights into warship construction. Using principals put forth through various experimental studies, this research attempts a minimal reconstruction of an Egadi warship. The reconstructed hull shape is compared with historical evidence, present in ancient accounts, to present a possible classification of the rams found at the Battle of the Egadi Islands Site.

Sewn-plank technology in the Western Indian Ocean in the 10th-15th centuries CE: the case study of the ship timbers from al-Balīd, southern Oman.

Alessandro Ghidoni

Recent excavations in the Islamic port of Al-Balīd, in the Southern Oman (10 th-15th centuries CE), have brought to light a large number of timbers, consisting of planks, and perhaps beams, from sewn vessels, re-employed as structural elements in the walls of the citadel.
Our knowledge of sewn boats in the Western Indian Ocean during the pre-modern Islamic period (622 – 1500 CE) is relatively limited and relies on vague textual descriptions, rare iconographic evidence, ethnographic studies and scarce archaeological finds. In light of this shortage of data, the boat timbers found in Al-Balīd represent a unique collection within the context of the maritime technology in the Indian Ocean during this period.

The timbers show a wide variety of sewing patterns, techniques and materials used for the construction of sewn vessels. Some of the planks have preserved ropes, caulking material and decorative motifs carved and painted on their surface. Radiocarbon date and species identification analyses of the timbers provide insights about possible chronological changes in construction technique and, overall, deepen our knowledge on the trade network of the materials used to build these ships that sailed in the Indian Ocean, carrying people, goods and ideas back and forth from East Africa to China, during the middle Islamic Period (10th-15th centuries CE).

Maritime Heritage Engagement in a Modern World

Danielle Newman

Heritage managers have increasingly recognised the need to address the issue of public engagement, both within the maritime context and heritage in general. The lack of maritime heritage and archaeology on the many school curriculum means the public's fascination with the subject has the potential to be sated by dubious sources and their impression of the field to be based on popular culture and treasure hunting documentaries. Because of this competition, it is important that the messages being communicated on behalf of the heritage management community are not only truthful and ethical, but can also capture the attention of the public. The public is no longer satisfied with static objects and simple text. In order to remain competitive for public time and attention, heritage must combine modern technology and communication skills with classical interpretive techniques. Modern heritage engagement must walk a fine line between education and entertainment.

This talk explicitly aims to showcase some new trends in engagement and to understand what the intentions of maritime heritage initiatives and the goals of people who deliver them tell us about public engagement and access within England. Who are these messengers? What are their messages? How these being communicated to the public and what is the potential of the field? This talk will discuss five themes being examined as part of my PhD thesis and some preliminary results of qualitative research.

Maritime archaeology in Biscay, Basque Country. Facts, acts, research and Opportunities

José Manuel Matés Luque

Considering that the province of Biscay is a land related to a long tradition of maritime history, maritime archaeology has been an overlooked theme here until recently.

In 1998, a late 15th clinker built boat, known as the Urbieta wreck, was found in an old river course while conducting watching briefs.

From that moment on, some other maritime archaeological projects have been carried out, some ordered by the archaeological administration, others by private iniciative. Thus, the search for the sunk of the Bou Nabarra -a fishing vessel armed to protect a convoy during the Spanish Civil War and sunk by a battlecruiser after several hourshas been some sort of "Grail Quest" for her heroic art; despite the different campaigns, her whereabouts are still unknown.

The Bakio shipwreck is another underwater project with a recent survey run to know more about what is said to be a late 18th century British small warship.

In the Laida beach, remains of two 19th century ships were found recently and some monitoring dives have been run.

While performing a watching brief on the regeneration of the Laida beach, a small clinker built plank was found; C14 dating places it between 1210 and 1275 making it the oldest clinker built timber for Biscay and helping, therefore, to fill the gaps of the shipbuilding tradition in the Basque Country.

In addition to these, watching briefs were carried out in Bilbao regarding the repairs of the waterfront, getting a date about the development of berths and docks from, at least, the late 19th century.

More maritime activity has been done to assess the age of a pier connecting the beach in the town with the island across the inlet in Lekeitio. The evolution of such pier from its origin, in the early 18th century, to the most recent repairing works was achieved.

In Bilbao, despite being a very industrialized city, some maritime archaeological works have been done; for instance, a basic recording of some stone fish weirs were done but the most important act is the watching briefs of several parts of the waterfront.

Although the above are the most important archaeological projects, recoveries of a boat timbers buried on a beach, a stone anchor and other bits and pieces have been deal with to get a better understanding of them and how they fit within the maritime archaeology and history in Biscay.

Finally, a new research project in the intertidal zone is currently taking place and it is hoped that once finished a better understanding of many of the remains will be achieved.

This presentation will go through all these sites and remains and it will assess the current stage of the research and the future of maritime archaeology in Biscay and it will show that, for the last 20 years step by step, maritime archaeology in Biscay is finding its place.

Introduction of Underwater Archaeology in Korea

Yong-Hwa Jung

Surrounded by the sea on three sides, it was water and maritime transportation that really developed in the Korean peninsula rather than ground transportation. Ships and relics that were sunk during the process are scattered under water. Most excavations of Korea's underwater relics begin because of accidental discoveries during fishing activities. The existence of relics is confirmed and the excavation begins. Since 1971, over 5400 underwater artifacts have been found at 308 sites.

South Korea's underwater archeology has been for 41 years since the excavation of Shinan shipwreck in 1976. Academic excavations in Korea started with the Shinan underwater excavation and in Wando, has even excavated a celadon transport ship carrying ceramic ware. Then followed the Jindo excavation that dug up a wooden vessel, the Mokpo Dallido excavation that found a Goryeo vessel, the Shinan Anjwado, the Ansan Daebudo excavation as well as the Mu-an Doripo excavation that discovered a diverse array of celadons, the Gunsan Biando and the Sibidongpado excavations. Goryeo celadons were found also in Gunsan Yamido, Boryung Wonsando, Taean Mado, etc. Until now up to 2 foreign ships and 12 korean ships and 1 as well as around 100,000 underwater relics were discovered from a total of 24 sites.

In this paper, I would like to briefly introduce the achievements of Korean underwater excavation and its future prospects.

Cultural Underwater Heritage of the South Pacific Armada

Cristina Agudo Rey

During the XVI, XVII and XVIII centuries, the Viceroyalty of Peru was one of the main trade centres in silver production and the core of the Spanish Colonial Empire. Because of this, privateers and buccaneers would be a constant presence in the South Pacific Ocean waters and the Viceroyalty had to develop its own Armada in order to defend its ships and trading. This Armada was named The South Sea Armada or La Armada del Mar del Sur. In order to acknowledge the underwater heritage of the Peruvian coasts, we present a project to elaborate a maritime archaeology map. This map would allow us to consider and analyse the South Pacific Armada shipwrecks and develop its heritage impact assessment and future protection within the maritime archaeology field.

Managing the Threat: A Maritime Archaeological Study of the Island of Menorca as a Key Ancillary in the Roman Mediterranean.

Margaret Amundson

A consensus of sources date the Roman 'conquest' of the Balearic islands to 123 B.C. Almost without exception, modern scholarship continues to reference this event in such terms. This paper challenges the accuracy and appropriateness of this type of characterization in light of a re-evaluation of current archaeological data alongside a review of the written accounts. Based on shipwreck data and other evidence, the Balearic archipelago of Spain was at that time both a relevant source of production and essential to maintaining certain critical maritime routes in the western Mediterranean. By the time of the intervention led by Q. Metellus to take control of the islands on behalf of Rome, piracy in the region had reached a critical level. This paper evaluates the significance of the threat of piracy at that time to better assess Rome's motivations for ultimately taking action as it did, when it did. It is anticipated that this line of enquiry will draw attention to Menorca's role in broader concerns about western Mediterranean security and maritime economy in the Roman epoch, and prompt further discussions about problematic narratives regarding the incorporation of the Balearics into the Roman Empire. To this end, the most recent underwater archaeological activities and published findings around the island of Menorca will be examined. As few references specific to Menorca are made in the ancient texts, the information gained from marine archaeological survey, particularly in the twenty-first century, has significantly contributed toward knowledge of its maritime history prior to, and throughout the Roman epoch. The island's unique features and geographical position appear to have been the most determinant factors in its historical destination. Finally, some of the assertions presented in this study may contribute toward discussions about the globalizing processes at work in the ancient past, and the changing role of islands within the context of a globalized society.