Concepts, methods and tools
Session 09

Strategy, Practice & Trends in Online Archaeology

(Wednesday 23rd 10h30-18h Pantheon S1)

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There is always more to learn about where the key challenges and opportunities lie for archaeology in terms of the internet, its technology and its applications. Institutional and cultural change alongside experimentation, testing and consultation are all required. This session will explore how archaeologists are collaborating, implementing and using web-based technologies (databases, WebGIS, journals, blogs etc) and will try to address questions such as:

- How do we build, implement, and sustain online archaeological resources?
- What are the important digital archive / preservation issues we need to consider?
- How do we integrate and re-use digital data in heritage resources?
- Where is the development and application of open data leading us?
- How do we use the web to promote awareness and monitor usage and reach a wider public?
- What are the current web-based applications for archaeological fieldwork, studies, publishing, conservation and site management?
Archaeological open access journals: the case of “Archeologia e Calcolatori”

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Our paper intends to provide an overview of archaeological open access journals - with particular reference to Italy, starting from the experience of “Archeologia e Calcolatori” - and offering a comprehensive survey of the situation in France and the Anglo-Saxon countries.

The Internet is now recognised as an important tool for the dissemination of knowledge and research exchange; all sectors are adapting to this new environment, including classical studies, which more than others remains attached to traditional forms of knowledge transmission and publication.

Alongside published journals, online open access journals (of which we describe some examples related to the above-mentioned geographic areas) are increasing considerably, and are acquiring an important role in the publication of scientific results.

In the archaeological sector, a distinction can be made between journals conceived in electronic format, generally in recent times, and others, in paper format, that make the full text available online, and finally those, generally with a longstanding tradition, that share online only part of their contents.

For fully open access journals, an important reference is the website Directory of Open Access Journal (DOAJ19, http://www.doaj.org/), a repertoire of electronic journals freely available online, created by the University of Lund, which currently includes more than 8,000 titles, belonging to different disciplines. The aim of this initiative is to increase visibility and promote the use of open access resources. The number of journals has steadily increased, emphasizing the growth of this important publishing industry.

“Archeologia e Calcolatori” is included among the Italian journal in DOAJ. This journal began in 1990 in paper format only, and since 2005 has joined the Open Archives Initiative (OAI) and is also published online. All articles published since 1998 are available in PDF format. The articles are shared in the circuit of the Open Archives, allowing harvesting from OAI service providers. Items are also deposited in the database of CNR SOLAR (Scientific Open-access Literature Archive and Repository, http://eprints.bice.rm.cnr.it/) and can also be retrieved from the PLEIADI portal, the national platform for centralised access to scientific open access literature (http://www.openarchives.it/pleiadi/).

Our study also provides a brief overview of open access features and Creative Commons licenses.

The Internet and Open Access in Archaeology

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Open Access (OA) has recently become very relevant to many archaeologists as more organisations and governments now mandate OA publication as a condition of funding. The concept of OpenAccess is inseparable from the Internet, it is in the very definition of OpenAccess:

«By 'open access' to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself...» Budapest statement on Open Access

While this paper will briefly review OA and its relationship with Archaeology and the Internet, the main focus will be how the Internet and OA in Archaeology are growing and changing with the advances in the Internet. Specifically, it will examine how:
with the website Open Access Archaeology I am using «bots» to disseminate Open Access Archaeology journal articles on different social media platforms, like Twitter and Tumblr. - the number of Archaeology Journals, most Open Access, are growing exponentially because of the Internet and the advances made in software development e.g. Open Journal Systems, OCR, etc. I will share experiences setting up a OA.archaeology journal with OJS and OCR.

- the nature of publishing is changing with «data papers», «born digital», and interactive changing how we present our information. I will share some experiences with these different new forms of publishing, some of which are from Do It Yourself (DIY) experiences.

**Open Access and Documentary Tools : The EMA Database on Child Graves in Antiquity and its bilingual recording system**

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Through the EMA project (Death and the Child in Antiquity) case study, this presentation relates to how archaeologists use a variety of technologies to record and disseminate data. Three french teams, Centre Camille Jullian of Aix-en-Provence, the Archaeology and Science of Antiquity UMR of Nanterre (ArScAn) and the Center of Alexandrine Studies of Alexandria, have created a database for children's graves, funded by the French National Agency for Research for Research for four years (2008-2011).

Born in the context of a study of the status of the child, the EMA Research Project has covered the ancient Greek and Roman world from the beginning of the 1st Millennium BC to the end of Antiquity. The database gives access to 4.000 records on the graves of children, with a variety of elements such as topography, location of the grave in funerary or other areas, markers, graves, containers related to each individual and goods. The contents have been prepared in cooperation with a research network of various institutions in Italy, Greece and Egypt.

The database is accessible on line in open access (http://www.mae.u-paris10.fr/ema/). More than 90 % of the documentation is available for consultation, after the consent of each of the concerned contributors. The languages of both database and website are French and English. The website functions with MySQL-PHP. The project considers actually the opportunity to notify the community about the resource.

The presentation relates to the achievements of the EMA System : collaborative database, structure and data model, international vocabulary, pictures digitalization, data preservation, digital publication. The focus will be on the possibilities to develop the access to the website and it is envisaged that a study of users needs and web practices will be developed.

**Data publication - the new black**

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The awareness and concept of a ‘data paper’ or a data journal seems to be gaining some traction in the archaeological community. Sometimes the level of recognition gained from depositing your archaeological research data with an accredited repository is limited and so a data paper enables the author/creator to get academic credit for publishing their data, making it accessible and sharing it with the community. Closely linked with the Open Access movement, data publication is still in its infancy and collaborations and developments are already taking place. Situated within the context of the wider digital publication landscape, this paper will look at the trend of data publication but also looks at how this trend may affect the character of archaeological narrative.
Communicating and interpreting archaeological heritage in social media: passion for archaeology on Facebook

This paper attempts to address the subject of archaeological heritage communication and interpretation in social media within informal groups, viewed as communities of practice, by taking the case study of Lithuanian archaeological communities on Facebook. The concept of communities of practice, originally defined by J. Lave and E. Wenger (1991), has been widely discussed among scholars. A community of practice is a special type of informal structure usually formed by people, who have a common sense of purpose and need to share their experiences. This paper seeks to understand how particular communities driven by a shared passion for archaeology engage with archaeology through Facebook.

The research topic of social media usage within archaeology is a new one and still developing. In the recent years, the subject was approached by several authors, who tried to grasp particular aspects of its use (Morris, 2011; Whitcher Kansa & Deblauwe, 2011; Pett, 2012; Richardson, 2012; Sanchez, 2013; etc.). In addition, questions of social media archaeology were more widely discussed during the main archaeological conferences, as well as in minor seminars, and also addressed by different researchers on blogs, forums, etc. It is acknowledged that community engagement has been always relevant to archaeology as public interest in the field has been always evident. Recent approaches of public archaeology and various other forms of social participation through social networks suggest that social media serves as a facilitator for further public interests to be expressed. Moreover, these practices could shape ways in which we perceive archaeology.

The case study on Lithuanian archaeological heritage practices in social media showed that communities of practice are the most engaged in disseminating and generating archaeological content. This fact suggests that in order to understand a successful adoption of social media for archaeology, more diverse archaeological communities and informal organizational structures should be considered. Thereby this paper attempts to contribute to this new topic of research by analyzing social media networking practices based on community engagement and social participation, which are directly relevant to the field of archaeology.

Specifically, in my paper, I will present 25 national communities of practice that strongly rely on archaeological data (experimental archaeology, heritage interpretation and history living communities) and discuss their activity in social media in order to show how social media space, e.g. Facebook, fosters archaeological communication and interpretation of archaeological content. I will also discuss particular aspects of this activity, such as interactions between individual actors (amateurs/professionals) and wider public, forms of participation, the nature of shared and generated content, and also explore main issues arising from this kind of community engagement.

Presenting Archaeology in Real-time: The Use of Blogging, webcams, and 3D Modeling for Engaging a Public Audience

Reaching out to public audiences is critical for educating them about archaeological findings and showing the relevance of the discipline to modern life. Social media and other online technologies allow archaeologists to make their work much more visible to the public and give audiences the opportunity to follow the excavation process as it is unfolding rather than simply learning about the findings at the end once an investigation is completed.

Dedicated to interpreting Virginia’s eighteenth-century capital during the American Revolution, Colonial Williamsburg has had a long tradition of public archaeology. Onsite guests have been encouraged to watch ongoing archaeological investigations and to ask questions about what the archaeologists are finding. Over the past five years, however, our approach has evolved to include a range of web 2.0 approaches. This paper will discuss two reconstruction projects involving archaeology and how web technologies have been used to bring the public into the excavation
process. In 2008 and 2009 Richard Charlton’s Coffeehouse was reconstructed. From 2010-2013, James Anderson’s Blacksmith Shop and Public Armoury complex was rebuilt. Archaeological research was critical to our understanding and the reconstruction of both sites. While onsite guests were able to visit the excavations in person, guests anywhere in the world could follow our progress and understand how the archaeological findings were being incorporated into the physical reconstructions. Each project had a blog, and archaeological updates were regularly featured. The blogs facilitated direct communication between the public and audience through the comments in which questions could be posed directly to the research team. The projects also employed live webcams transmitting a new image every five seconds to allow people to watch the reconstructions and archaeological investigations. Both sites have also been modeled in 3D to multiple time periods and the virtual reconstructions have helped to explain how the sites changed over time, something quite difficult with just a physical reconstruction. With the completion of the Armoury reconstruction, we will be launching a new blog to provide regular updates on the archaeological research as we work on different sites around the town. This paper will explore this integrated approach of using blogging, webcams and 3D modeling to present archaeology in «real-time» and what we have learned about using these methods for effectively engaging a public audience.

Strategy for the future? Present practice in online archiving of archaeological data

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This paper describes the development of ADS easy, an online system for facilitating the deposit of digital research data with the Archaeology Data Service (ADS), a trusted digital repository for the UK historic environment sector. ADS easy provides an online costing tool and a mechanism for the upload of data and metadata files. The semi-automation of the deposit and ingest process will reduce costs but will also give users great control of their archiving. It is argued that this may, in turn, lead to greater engagement with selection and retention decisions. The growing dependence on digital data in archaeology has raised awareness of the need for long-term preservation of the datasets resulting from archaeological research. The ADS is the mandated repository for many organisations within both commercial and academic sectors within the UK, providing archiving services for the digital outputs of archaeological fieldwork and research. The ADS has been able to harness over fifteen years of experience in preserving and disseminating archaeological digital data, to develop an online system that will both streamline and enhance elements of the archiving process. ADS easy, an online tool to allow depositors to estimate archiving charges and to upload files and metadata to the ADS repository, will reduce archiving costs and make digital preservation an economic reality for those working within the archaeological community. At a time when the UK historic environment sector is suffering from reduced funding the need to develop a sustainable funding model is an imperative. ADS easy was developed under the SWORD-ARM project, and has been funded by the Joint Information Systems Committee (JISC). Within the project the ADS has refined and enhanced the archive ingest and charging processes, using systems that will both streamline and semi-automate the deposition process. Using ADS-easy will deliver real benefits to depositors in terms of their ability to deposit data, create and validate metadata, and engage in the process of selection and retention. It will also allow them to manage single and multiple deposits and, perhaps most significantly, to manage cost estimates and accounts. ADS easy also presents the opportunity to enhance ADS data management systems and to build upon existing business infrastructure and role as a discipline-based repository.
IANUS is a project, funded by the German Research Council (DFG) and coordinated by the German Archaeological Institute (DAI), which aims to build up a national digital archive for archaeological and related data in Germany. IANUS is currently under construction and its primary goals will be the long-term preservation, dissemination and aggregation of digital data. Furthermore IANUS will offer manuals, advice and best practice examples for handling digital data in classical and ancient studies.

Based on expert talks with members of existing national and international data centers, software repositories and relevant technical systems, the conceptual framework for the structures, the workflows and the services of IANUS is worked out at the moment. Building upon this an organizational structure will be developed in the second phase of the project so that in the end a national center for research data in archaeology and the study of the ancient world exists.

In the current phase IANUS has also conducted a survey in order to find out what the German archaeological community expects from a digital archive. The survey was directed to a broad audience, to almost all archaeological institutions in Germany (e.g. universities, research institutes, academies, state offices for cultural heritage, museums, etc.) and was conducted from May to October 2013 with an online form, allowing for anonymous participation. On the one hand, the questions covered the current practices in the use of digital research data and its management. On the other hand, they tried to elicit needs, requirements, obstacles and expectations of the scientific community in regard to the planned services by IANUS.

As one of the first outcomes from the conceptual phase of IANUS, we will present the results of this stakeholder analysis. The talk will give an insight into the creation, implementation and above all the answers of the survey and will discuss its implications for the future design of IANUS.

Possible open questions to be answered will be, such as: What conclusion can be drawn from the results? What questions remain unasked? How, where and when will the results be published? How does the practice of research data management in Germany look like? Can we increase the acceptance of a new research data center by integrating user needs and wishes?

View and share geo-referenced data at different scales: Chronocarto

Chronocarto is a tool for sharing geo-referenced data online through the web. It is developed within the framework of a scientific partnership between UMR AOROC (CNRS- Ecole Normale Superieure) and Geocarta SA. France. Different departments from ENS (Antiquities, Geography, Geology) have joined together in order to operate and publish their spatial data using the same media.

At the beginning, Chronocarto was developed at a ‘settlement’ level, for areas from 1 to 100ha. It enables an easy overlay of different data layers (geography-survey-excavation-interpretation-
geology - seismic faults) and to publish them on the web. First developed within a private network of researchers, Geocarta has evolved quickly into a collaborative tool with specific needs from different communities. In particular, specific applications were developed both for large or small scales with different public interfaces corresponding to specialized topics. At the site or intra-site level, Chronocarto viewer is able to publish online and superpose different types of documents which can lead to the detailed analysis of a territory. For a specific approach at a large-scale, we have create a Chronocarto ?s derivative on the form of automatic atlases. These Atlases are an additional tool to our paper publications, allowing us to enter the multimedia era. In first, the Iron Age Atlas was developed in order to display for the public a 15000 sites data base for France. It should be extended soon to all over Europe. The dynamic display of the maps is the result of a combination of questions «where? When? What?». These automatic mappings show the distribution of sites as points, but in a second part, more elaborated maps are proposed to the user as a more global response to the “What” questions. These thematic maps are elaborated by researchers and also points to different hyper-links (.pdf, .jpeg, Date base, etc.). The qualitative objective is to present a rapid statement of the question in the most varied themes.

The Virtual Cilicia Project - How to use Google Earth as a visualization environment in an archaeological context

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Since 2005, a particular research focus at the Institute for Archaeological Sciences in Bern has been on the exploration of Cilicia, specifically on the settlement clusters in Cilicia Pedias. This research coincides with three surveys and excavations (Magarsos, Sirkeli Höyük, Uzuno?lan Tepesi). The reconstruction of the paleo-landscape is a primary goal of the collaborations of Instanbul Üniversitesi and Çanakkale Onsekiz Mart Üniversitesi. Namely the knowledge of the ancient river courses as well as the water supply and irrigation networks plays a crucial role in the comprehensive understanding of the historical development within the plain of Cilicia. In addition, the evaluation of the relationships among the city states within the settlement clusters requires an inseparable link to research on street networks and exchanges during the associated time period. To visualize the development of this complex region at the crossroads among Anatolia, the Levant, and Syria during the different epochs and to provide a better understanding for laypersons, new approaches are necessary. New methods of knowledge transfer should not be limited to a linear narrative structure; rather, they give users the chance to interactively explore the interplay between environment and settlement patterns. This offers the user the possibility to adapt the provided information to her or his state of knowledge and specific interests. To achieve these goals within the so-called «Virtual Cilicia Project» a Google Earth based approach was chosen. The use of a virtual globe as a tool for archaeological visualization allows for the integration of heterogeneous data sources, thus providing the opportunity to compare ancient and modern states. Since Google Earth uses KML 2.2, an open standard XML notation, it is simple to add one’s own content. In addition, KML became an increasingly common standard within geographic information systems and online tools, therefore becoming a well-documented future-proof solution. The integration of a timeline directly into Google Earth makes it a perfect instrument for the visualization of historical developments. This paper recapitulates the special benefits of virtual globes as a media in historical and archaeological research and presents the particular approach of the «Virtual Cilicia Project». It develops a perspective toward a best practice approach for the use of Google Earth as a valuable tool in knowledge transfers for infotainment.
Web GIS development on the archaeological site of Delos (Cyclades, Greece)

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From 2003 to 2011, the French School at Athens (FSA) has regularly supported some field missions in Delos, in order to draw up an atlas where you can find all the ruins from the prehistoric period to the Byzantine period but mainly from the classical antiquity in their present state. This atlas will be published in 2014 in the collection of «Exploration Archéologique de Délos». Since 2006, we have been looking for a way to convert this atlas in GIS. But it’s only in 2012 that we thought of a web GIS solution, an innovative tool which targets both researchers and the public, and simplifies data management.

After two five months internships, we propose a complete web application, which provides all functions characterizing a GIS: capture, display, modeling, analysis, storage of spatially-referenced data. It is built on client-server architecture through GeoServer, a server for geospatial data, which implements the OGC Web Services (WMS, WFS and WFS-T). Data is stored in the PostgreSQL database management system and its spatial extension PostGIS. The interface is constructed by using HTML and CSS, and webmapping functionalities are implemented as calls to JavaScript libraries such as OpenLayers, GeoExt and Heron MC, customized given the specifications of this web GIS.

We lead a broader reflection on how to collect and match data from the various researchers associated to the FSA, who work on Delos and come from different institutions and countries. This has led us to focus on forming services for the interoperability of data, both internal to the « Delian» community, and respecting the international geomatics standards.

This web GIS is available for consultation on the FSA’s website at: http://www.efa.gr

Beyond the map: a dialog between paper and connected devices. The example of the GIS of the archaeological site of Western Thebes (Luxor, Egypt)

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The archaeological area of Western Thebes, inscribed on the World Heritage Sites list of UNESCO, has recently received a mapping project held by the Egyptian Ministry of State for Antiquities (GIS Center) in cooperation with the French Ministry of Foreign Affairs. The carrying out of this map, a GIS/Geodatabase initially designed for an internal use, has taken benefit from many tools released in the very last years, while many analogical and digital material became more accessible and usable for the archaeological community. Thus, maps, plans, satellite imagery, aerial photographs and Digital Elevation Models were used in order to synthesize the global knowledge of the site, when GPS surveys and terrestrial photogrammetric campaigns were undertaken to record and update its archaeological and topographical current condition. Although the main public outputs of this project happen to be printed materials (Archaeological Atlas and Maps), a reflection has been initiated on the modalities of exploiting and disseminating its native and genuine digital contents towards different audience.

In the first place, the internationalized and compartmentalized archaeological missions operating on the field expresses a tremendous need for putting into perspective their own archaeological results with those of others, i.e. proceeding from their own local grid towards a global system by using a common technical language. In the second place, the visitors, by having access to such
a rich and vast archaeological area, may claim for a localized and detailed information while they are experiencing the site or are about to discover it. And in the last place, the authority in charge of the site management and preservation should have access to an user-friendly tool helping at monitoring with the condition of the area.

In an attempt to fulfill these needs, a webmapping platform is currently implemented and experimented, using the Open Web Services defined by the Open Geospatial Consortium. Therefore, any computer operating a GIS or CAD software might be retrieving data through the standardized Web Map Services of Web Feature Services. Moreover, any device equipped with a web browser is turned as a terminal for the display and the request of archaeological information; likewise, the recent class of GPS-enabled smartphones are eligible to display and request the same kind of data, but dynamically localized. And finally, the use of these devices with cutting-edge Augmented Reality applications opens new ways in the comprehension of the site, in situ, and also while standing in front of the traditionally published map.
The main goal of the project Finds of Roman Coins in Poland is to create a complete database of the findings of the Roman coins in Poland. The project covers the territory of both modern Poland and some parts of the 1st Rzeczpospolita (1st Polish Republic till 1795): Eastern Galicia (currently north-western Ukraine), and the Duchy of Prussia (currently Kaliningrad district). As for the chronological range, the project covers the finds of the coins of the Republican origin as well as Imperial, Provincial and Early Byzantine i.e. ranging from the 3rd century BC to the 6th century AD. It is directed by prof. Aleksander Bursche from the Warsaw University and funded by a grant from The National Programme for the Development of Humanities of the Polish Ministry of Science and Higher Education.

The project focuses mainly on creating the Internet Database of all of the findings of Roman coins in Poland and some adjacent territories. This Database that will be gradually supplemented is intended as a tool of search queries, statistical analysis and mapping overviews. We are going to catalogue coins which are stored in Polish museums, universities collections, local branches of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences and conservation centres. The project involves the search quarries in local divisions of the National Heritage Board of Poland, museums and archives as well as literature query and field verification of coin finds. During our project we are using the same software as RGK DAI in Frankfurt and NUMISMA standards. We are also cooperating with The Oxford Coin Hoards of the Roman Empire Project. Finally we are going to include the coins into the standardised system of Die Fundmünzen der Römischen Zeit.

The Database will serve both numismatists as well as historians and archaeologists. It will certainly be also a very useful tool in the studies of the contacts between the Roman Empire and the Barbaricum both economic and political. Moreover the Database will enable researchers to do analysis of the importance of the impact that ancient Mediterranean cultures had on the inhabitants of Poland in ancient times. It’s also crucial that the open source database will be available online for both Polish and foreign researchers.