S10 Theorising the Digital: Digital Theoretical Archaeology Group (digiTAG) and the CAA

James Stuart Taylor, Sara Perry, Nicolò Del'Unto, Åsa Berggren

Computing and the application of new digital technologies in archaeology and the heritage sector more generally have been advancing rapidly in recent years. This 'digital turn' is reflected in the growth and success of the CAA international conference, and in the emergence of a range of dedicated interest groups and associated digital outputs around the world. In concert, pressure has been increasing to situate the application of digital technologies within a wider theoretical framework, and with a degree of critical self-awareness, thereby allowing for rigorous evaluation of impact and disciplinary change. This is something that the CAA, as a nexus for the discussion of applied digital technologies in archaeology, has explicitly addressed throughout its history, and particularly in recent meetings, with a range of round tables and theoretically-engaged sessions that have proved popular amongst the digital community.

TAG, another well-established conference, with a long history of fostering progressive and critical debate in archaeology, has never explicitly aimed to address the various theoretical consequences of the digital turn. As such, this session seeks both to broaden the TAG family to attend to the rapidly- growing computational sphere of archaeological practice, and to work with the CAA to consolidate its own efforts to theorise and encourage critique and evaluation of the effects of the digital turn.

We invite participants to deliver papers that question, challenge, appraise and reconceive the epistemological and research-oriented implications of the digital turn--as well as its larger social, political and economic consequences. In short, what is the actual impact of the digital turn upon archaeology and the wider heritage sector? The session will culminate in a chaired discussion amongst all contributors, with a focus on both debating the future of the concept of 'digiTAG' and rethinking critical engagement with digital practice in archaeology and heritage overall.

S10-01 Theorising the digital turn in archaeology

Sara Perry, James Taylor

"We are all digital archaeologists" is an increasingly common refrain amongst practitioners today. However, this ubiquity of computational approaches in archaeology seems hardly understood. Debates about the philosophical or cultural dimensions of digital technologies in the discipline have a deep legacy, yet the technical capacities of these tools still tend to eclipse meaningful critique of their implications. Problematically, it is usually the *applications* of computers that become the overwhelming focus of digital archaeological discussions at our conferences, in our written work, and often in our classrooms too.

This trend to value the technical above the theoretical is one that is seen across many fields ' and it is made worse by the fact that it tends to betray itself again and again as any new piece of gear is added to disciplinary toolkits. The Computer Applications and Quantitative Methods in Archaeology enterprise itself hints at the predicament, for applied methodology is foregrounded in the organisation's very name, with richer qualitative analyses of the digital seemingly consigned to the backstage. As an introduction to digiTAG, then, this paper makes a case for the necessity of reversing this situation, prioritizing critical engagement above practical exposition. To do so, we review the history of - and tensions between - digital methods in archaeology and the intellectual and social systems that shape (and are shaped by) them.

Ultimately, we aim here to broach a range of issues that habitually go unspoken: How do computer applications in archaeology intersect with local and global socio-politico-economic complexes? How do they perpetuate or challenge structural inequalities? How do they

contribute to wider patterns of consumption, excess, loss and waste? How are they folded into the institutional status quo? And how do they shape not only our thinking and doing of archaeology, but so too our more intimate ways of being-in-the-world?

S10-02 A plea for (non-mathematical) reason. Rethinking the use of computational methods in archaeology
Catalin Nicolae Popa, Oliver Nakoinz
In this paper we argue that while computational methods offer exciting possibilities to archaeology, their large-scale unreflected use is making our discipline too mechanical and mathematical.
There is little doubt that many digital methods have made a positive contribution to our work. The use of digital techniques during and in combination with archaeological fieldwork has unquestionably given us more control over what we excavate. Such methods have also provided simpler and more interactive ways to explore our data and convey them to others. But they are no substitute to interpretation!
However, some computational methods are frequently employed as a means to explain the material record, with near total disregard of archaeological theory. Most of these approaches fall into the category of computer modelling and simulation. There are a plethora of studies and presentations utilizing such methods with little theoretical grounding. For example agent-based modelling papers, where theories of agency are rarely referred to. Additionally, results are often taken for granted, as if offering factual solutions, without critical evaluation and interpretation.
Such use of computational methods is damaging to the community employing them and to archaeology as a whole. The over-enthusiasm with these approaches, the belief in the objective nature of 'the machine' (i.e. computer), and the wish to transform archaeologists into applied mathematicians brings the dawn of a New New Archaeology (sic!). Currently, many scholars are still sceptical towards studies employing such methods, contributing to a division of the discipline. But archaeology does not need another theory war! We suggest an integrated approach, with balanced parts of method and theory. For archaeologists using computational methods this implies a wider integration of post-processual critique. In this manner, the full potential of these approaches can be realised as they would find their well-deserved place in archaeology.

S10-03 The biography of a 3D print
Mhairi Maxwell
Over the past 5 years the digital has naturally crept into my work and subsequently influenced my practice. I have been digitally turned, but have not forgotten my roots. By June 2016 I will have attended my 12th TAG, but this will only be my 2nd CAA. I welcome this session and concept of 'digiTAG' as a conscious opportunity to reflect on this.
This paper will be a material culturist's take on the rise of the digital. This will be explored through the biography of a 3D print of an archaeological monument; its making, use and deposition (Appadurai, Kopytoff, Latour). Digitally created objects move in and out of different material and immaterial networks of engagement in which their value is re-negotiated. They are enchanted through these networks of engagement (Gell). I will reflect on the ACCORD project (in which I was the PDRA), which co-produced digital records with local communities in Scotland, and my own research in progress.
Critically studying the social biographies of digital artefacts has implications for how we can understand and re-imagine human social and political relationships with heritage and archaeology in our contemporary world, now so often enacted immaterially through fiber-optic cables and LCD screens, then materialised by Makerbots. Additionally, it will attempt to

explore whether established theories of the gift, and reciprocity and exchange (e.g. Mauss, Miller, Strathern), have merit for understanding how social relationships are built with archaeological artefacts and monuments in the digital era.

Arguably, without considering the social lives of digital objects more generally, we are risking their commodification. In such a future, the value of the digital artefact (including the born-digital) will be determined irrespective of who made them, how they were made and their cultural significance.

S10-04 Epistemological considerations on image-based 3D representations: Bridging the paradigms through the objectification of field interpretation

Matteo Pilati

This paper investigates what image-based 3D models are and what their contribution is for archaeological epistemology. Given that this particular form of digital representation is integrated in documentation work, data management systems, as well as in different analytical and interpretive contexts, several assumptions are made about their contribution to information generation. On these premises, the risk is that the epistemological affordance of image-based 3D models becomes regulated by methodological frameworks which may not acknowledge the full palette of heuristic, informative, and documentary values inherent to these representations. The first point to be discussed relates to the automatization of the image-based 3D reconstruction process, its dependence on raster data and use of algorithms, which simulate optic perception, meaning that image-based 3D models are profoundly mimetic, true to reality and un-interpreted representations of archaeological contexts. From a methodological point of view, these models reproduce situations precedent to their representation-based interpretation and provide objective evidence for contextual analytical work. Another point is that given the truthfulness of image-based 3D models to reality and their detail degree they do not simply represent the physical boundaries of an excavated context or unit. Image-based 3D recording captures the archaeological contexts in a broader context of documentation surfaces, features, alongside details, actions which may be considered marginalia, and often cropped. This visual information is a record of the historicity of the excavation work, revealing onsite interpretation dynamics; it can be employed to inform excavation strategies, evaluate analyses and interpretations, promote reflexivity and adaptive documentation strategies, and enhance the historical presence of the interpreting subjects in the digital archive. Based on these observations, this paper states the capability of image-based 3D representations in providing objective and detailed information of subjectively shaped material evidence, hence drawing closer epistemological positions traditionally perceived as reciprocally opposed.

S10-05 How raw is raw data?

Dominik Lukas

The biggest threshold to understand scientific knowledge, as it is stored in heterogeneous datasets today, is not the general availability of data, but the lack of transparence of its meaning and how datasets interrelate on the conceptual level. Moreover the increasing availability of research data has made it necessary to deal with a 'deluge' of information also in archaeology. Terms like 'big data', a proposed '4th paradigm' or simply the propagation of a 'digital turn' are used to describe this development. In fact, the modalities of data storage and its publication on the Internet make it possible to overlook the inherent dependencies that are part of the process from data generation to retrieval. The strangely externalized matter that data driven research seems to be confronted with, even allows for the postulation of a 'new empiricism' - a point of view that fails to acknowledge the theoretical implications of the generation of datasets and their forms of storage, assuming that the sheer quantity of data has

made scientific method obsolete. In my paper I will examine the epistemological framework of data structures used in archaeological research, showing their theoretical and research strategic implications. I will argue that the relationship between archaeological data and its scientific interpretation, as reflected in the existing data models, must be understood as constituents of specific 'infrastructures of knowledge'. In consequence it is necessary to make scientific inference formally visible. The goal is the explication of semantic values embedded in the data structures and the mapping of provenance and inference. I will discuss whether this can be done through the implementation of existing ontologies or the development of specific micro ontologies, by presenting examples from the development of the ├çatalh├Ây├┘k Living Archive.

S10-06 Communication in archaeological fieldwork: Responses to a digital workflow
Leigh Anne Lieberman, Gregory Tucker
The emergence and adoption of convenient, reliable, and affordable technologies facilitates digital recording and processing in the course of field research, both improving the speed and quality of data entry and increasing access to data. This 'digital turn' in data collection and management has improved efficiency at the point of discovery, during secondary processing, and throughout later analyses. Consequently, much of the discussion surrounding the application of digital approaches in archaeology has focused on the data collection process and its subsequent impact on data dissemination. However, some of the secondary effects of this movement have not been fully evaluated, leaving us knowledgeable about the quantitative benefits of "going digital" but not about how this impacts researchers and how we conceptualize archaeological fieldwork and methodology.

Employing a completely digital workflow at the Pompeii Archaeological Research Project: Porta Stabia (PARP:PS) since 2010, we have observed that our approach has changed not only how we collect and employ data, but also how we interact with each other. We discuss results and interact with one another in different ways than before, with new expectations of what is possible in the field. Both specific details and synthetic ideas are able to be shared and collaboration takes place more quickly than ever thanks to our digital approach. Constant availability of digitally curated data has fostered an environment where asynchronous communication between team members is possible and, in many ways, preferred.
In this paper, we describe how the employment of tablets at the point of data collection, as the last link in an entirely digital workflow, has revolutionised not just the excavation, post-ex, and publication process, but also how we communicate at PARP:PS. Using our experiences as a case study, we aim to address not only the likely benefits that come out of our preference for asynchronous communication, but also the potential problems associated with this increased ease of contact as well as our experiences overcoming these issues. These concerns are not unique to PARP:PS, and thus, we hope to engage in a discussion of how the implementation of constantly evolving technologies influences archaeological practice, collaboration, and dialog in our discipline more broadly.

S10-07 The lives of digital machines: Evaluating the significance of historic computing machinery
Gareth Beale, John Schofield
Innovation has been a central concept in the formation of histories of digital technology. The significance of computing machinery is often defined in terms of innovation with comparatively little attention paid to the role which these technologies have played in the lives of users. The prevalence of this mode of historical narrative can at least in part be attributed to the tendency within a commercially motivated computing industry to place an

emphasis on novelty and originality. The limitations of innovation-centric histories of technology have been acknowledged within historical research (Edgerton 2006) and these critiques have sat alongside an increasingly critical approach to adoption of commercially derived technical concepts with academic research (Sterne 2003).

In this paper we will argue that archaeological approaches to the study of material culture can be utilised to build fuller accounts of the significance of digital technologies which are driven by use and impact as well as by innovation. The paper will describe the biographical and physical study of historical computers undertaken at the Jim Austin Computer Collection in collaboration with designers, engineers and users and will examine the interactions, modifications and experiences which help to define the significance and physical form of historical computing machinery.

Edgerton, David. 2011. The Shock of the Old: Technology and Global History Since 1900. London: Profile Books.

Sterne, Jonathan. 2003. "Bourdieu, Technique And Technology." Cultural Studies of Science Education 17 (3-4): 367ÔÇô89.

S10-08 Digital interpretive technologies: A way into difficult heritage in the Middle East and Central Asia?

Katie Campbell

Conflict, contested heritage and differing stakeholder interests have led to an increasing use of photogrammetry, remote sensing and 3D modelling techniques as the only means of recording, monitoring and interpreting historic monuments and archaeological sites across the Middle East and beyond. As a result, researchers are starting to make greater use of this digital data, for both academic and practical purposes. This paper aims to critically appraise the effect that the rapid transition from 'traditionally' to digitally collected field data is having both on our interpretation of these monuments and its role in informing conservation and heritage protection decisions in 'difficult' cases. The Great Kyz Kala, an early Islamic architectural monument that forms part of the UNESCO World Heritage site of Merv, in modern Turkmenistan, is a difficult monument. Not in the traditional sense that is associated with recent atrocities or ongoing tensions in the Middle East and Central Asia, but because of its iconic nature within the country and the crucial role that archaeology and historic monuments play in Turkmen narratives of a post-Soviet national identity. Discussions on how to interpret and conserve this rapidly deteriorating and enigmatic monument have been held over the last five years between various national and international organisations including UNESCO, the Ministry of Culture of Turkmenistan, and international collaborators including universities and embassies. These talks have, however, led to something of a stalemate in how to approach the monument in terms of its conservation and presentation, while academic research on the archaeology remains frustratingly limited. By combining qualitative feedback on the digital approach adopted by archaeologists from UCL, and a critical review of the decision-making processes behind actions at this monument, against the backdrop of a rapidly evolving political landscape in Turkmenistan, the wider consequences of this research strategy for the Great Kyz Kala will be assessed.

S10-09 Trends in digitalisation of archaeology: Interdisciplinary and archaeological viewpoint

Teija Oikarinen

Currently digitalisation is changing societies and the sciences. A doctoral research by author focused to study the current state and characteristics of the digitalisation of both global and Finnish archaeology.

Archaeology was examined through an interdisciplinary conceptual (theoretical) framework originated from the field of socio-technical information systems research and the field of science and technology studies. The framework allowed comparison of the characteristics of digitalisation between global and Finnish archaeology. The aim was to recognise digital development goals that may be either shared between various disciplines or specific to the field of archaeology. Archaeology was studied by utilising different kinds of data sources and case examples. This study was the first doctoral dissertation that discusses the digitalisation of Finnish archaeology. The aim was to create a global-local overview to start to analyse a country-specific state of digitalisation of Finnish archaeology.

Research produced results related with both global and Finnish archaeology. The utilised interdisciplinary framework made possible to create a fresh insights from archaeology. The results implicated, for example, that technologisation and computerisation of archaeology have been going on for decades, but even in a global context, the concept of digitalisation as a global phenomenon (from the utilised interdisciplinary viewpoint) is rarely attached to archaeological discussion of these trends. Technological development is uneven at the global level: there are trailblazers who already utilise the latest technologies. These leaders are currently developing, for example, digital infrastructures of various sizes, even transnationally. This trend is common in various disciplines. The answers to questions regarding digital development needs can be generalised to Finnish archaeology in its entirety, even the focus was originally in the context of historical archaeological excavation process. In the future, digitalisation will increasingly affect archaeology as a cross-cutting factor for materials and work practices.

S10-10 The apparatus of digital archaeology
Jeremy Huggett
Digital Archaeology is predicated upon an ever-changing set of apparatuses ÔÇô technological, methodological, software, hardware, material, immaterial ÔÇô which in their own ways and to varying degrees shape the nature of Digital Archaeology. Our attention, however, is perhaps inevitably more closely focused on research questions, choice of data, and the kinds of analyses and outputs. In the process we tend to overlook the effect the tools themselves have on the archaeology we do beyond the immediate consequences of the digital. This paper seeks to address the apparatus more directly within the context of the developing archaeological digital ecosystem.

S10-11 Deep maps of digital, post-representational archaeology
Piraye Hacıgüzeller
Moving beyond the epistemological objectivity-subjectivity debate, post-representational thinking in archaeology has recently started to explicitly challenge the idea of a past reality that exists independently from the present and future. A post-representational archaeology, with its neo- empiricist ambitions, is to concentrate its efforts primarily and explicitly on the witnessable formations of the present. The past in post-representational thinking is therefore not an existing code to be cracked or reality to be discovered. Rather, it is creatively constructed here and now through a set of relations presented together insofar as such presentations are found relevant and acceptable by consensus.

Despite the increasing influence of such ideas in the discipline, the core business of archaeological practice today still largely remains focused on seeking knowledge that truthfully corresponds to the "archaeological past". Post-depositional processes and practices of archaeologists in this context are treated as of importance as far as they influence the processes of revealing or interpreting the past.

I will be arguing in the presentation that "deep archaeological maps" facilitated by the digital transition in archaeology can serve to further destabilise the ideas of and hopes for an independent past that can be known, understood and explained. Specifically, cartographic data visualisation in archaeology can be carried out with multimedia deep maps populated with narratives, videos, sound recordings, maps of emotions, hopes, fears, pictures, personal and material biographies, as well as links to conventional archaeological databases and Big Datasets. Such "thick" cartographic presentations of archaeological sites would act as a continuous reminder of the identity of archaeological places, processes and pasts as continuously becoming at present. I will describe the possibilities for such deep mapping applications at ├çatalh├Ây┤┘k (Turkey) with the help of a multimedia deep map prepared with Prezi presentation software and in relation to the ├çatalh├Ây┤┘k Living Archive project.

S10-12 Bringing digital sociology to digital archaeology
Lorna-Jane Richardson
Often, the practice of public engagement in digital environments with archaeological subjects is seen, from the professional perspective, as the need to attract presence, and the expectation that lay people are participating when they are simply being exposed to specific cultural information. Participation and consumption have become mercilessly conflated.
Whilst classical sociological theories can be bought to bear on the interactions and 'social' dimensions of the use of digital media between professional archaeologists and the non-professional lay person, digital interaction often moves beyond the theoretical possibilities offered to us by Marx, Weber, Durkheim or T├Ârries. The work of Goffman, Bourdieu and other more recent theorists, and dramaturgy, the logic of practice and networked individualism are vital to our understanding of the potential for the replication of offline inequalities, the public display of expert knowledge, and the entanglement of social communication networks in the variety of digital environments provided by archaeological organisations.
This paper will explore the approaches that these sociologists can bring to an exploration of the digital turn in the archaeological profession, and examine what an in-depth understanding of digital sociology can offer the often 'magpie' discipline of archaeology.