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FUNERARY ARCHAEOLOGY AND DIGITAL TECHNOLOGIES: HISTORY AND DEVELOPMENT OF A SUCCESSFUL CROSS-DISCIPLINARY APPROACH

1. Introduction: some conceptual and terminological considerations[1]

The convergence between 'funerary archaeology' and 'digital archaeology' began in the early 1960s and further progressed alongside computer science advances. As often occurs at the inception of a new approach that requires an interdisciplinary way of thinking and acting, it represented a ground-breaking programme, albeit not systematic.

The objective of this introductory paper is to examine the historical and methodological features that marked the successful intertwining of expertise underlying these research domains. This challenging task requires a preliminary survey of the evolution of the two terms within the cultural sphere of reference in order to define the subject matter. As in any terminological analysis, the aim here is to establish a meaningful framework for both subjects in their uniqueness as well as in their theoretical and methodological background.

I will only briefly dwell on the subject of 'funerary archaeology', the focus of this workshop, illustrating an interactive plot generated automatically by the Ngram Viewer tool. This powerful online search engine, developed by Google in 2010, enables users to explore language usage trends over time by recording the occurrences of specific terms in a vast collection of books, documents, and other textual sources[2].

The results for the period 1960-2019 (the last year covered by the tool) show that the most widespread definition in the English language is 'mortuary practices'. The trend line began to rise in the early 1970s when the monographic issue *Approaches to the Social Dimensions of Mortuary Practices* appeared in the «Memoirs of the Society for American Archaeology», introduced by L. Binford's article *Mortuary Practices: Their Study and Their Potential* (Binford 1971).

On the other hand, 'archaeology of death' is less frequent and only developed in the 1980s, once again probably after the publication in 1981 of

[1] I would like to express my gratitude to the Ca' Foscari University of Venice and, in particular, to Giovanna Gambacurta for the very welcome invitation to this workshop dedicated to themes that enhance the interdisciplinary approach to archaeological research.

[2] In 2021, a similar tool was also developed in France: Gallicagram (https://shiny.ens-paris-saclay.fr/app/gallicagram). The search process is based on the digital corpus of Gallica and several other libraries, including the Persée portal.

another landmark book on the subject edited by Robert Chapman (Chapman, Kinnes, Randsborg 1981) in the series 'New Directions in Archaeology'. The term persisted steadily over time, with no significant variations even in conjunction with the publication of *The Archaeology of Death and Burial* at the turn of the new Millennium (Parker Pearson 1999) and of *The Oxford Handbook of the Archaeology of Death and Burial* in 2013 (Tarlow, Nilsson Stutz 2013).

As far as 'digital archaeology' is concerned, I recently focused on the naming (or renaming) of this discipline (Moscati 2021, 2023). 'Archaeological computing' or 'computational archaeology' aligns with traditional computer-based archaeological research and can be distinguished from the more recent 'digital archaeology', which implies a primacy of the technological approach over the epistemic commitment. This terminological switch mirrors what has occurred with 'humanities computing' and 'digital humanities', although rarely in archaeology has the terminological issue been theorised and invested with semantic value, as is the case for digital scholarship in the Humanities (see lastly Ciotti 2023).

The increasing adoption of the term digital archaeology to define the discipline – which will be used henceforth for the sake of immediacy – is closely linked to the development of computational tools and devices for the acquisition, analysis and transmission of archaeological data. The age of technological innovation in archaeology is not a new phenomenon if we generally date it back to the two decades after 1950. However, compared to the past, the responsible handling of technological innovation now represents a scientific functional revolution that characterises the data digitisation process in all phases of archaeological research, which aligns with the development of the Heritage Science domain.

2. Methodological aspects and distinctive features

Approaching this cross-disciplinary subject area solely in terms of technological achievements, however, would diminish what we have called a 'successful' intertwining between funerary archaeology and digital archaeology. It will be more constructive to prioritise research methods, just as has been done for funerary archaeology, which was granted its own identity in specific investigation areas aimed at studying both burial customs and social structures. In Italy, for example, at the beginning of the new Millennium, in the second volume of the Treccani Encyclopaedia *Il Mondo dell'Archeologia*, the section dedicated to cults and funerary practices – beyond the different chronological periods and cultural references, from Prehistory to the Middle Ages – was subdivided as follows: i) funerary areas and burial types, ii) grave goods, and iii) funerary rites.

Similarly, digital archaeology needs to be classified according to its methods and epistemological foundation. This is not a conservative attitude. On the contrary, it is the result of active participation in every IT innovation that has contributed to revolutionising the approach to archaeological research. Here are some examples: the shift from the hierarchical model to the relational one when structuring information in databases; the flexibility brought about by multimedia systems in matching data of different nature and from different sources; the geo-relational model of data management proposed by GIS for field research or that of BIM for ancient architecture; and the potential of visualisation and restitution tools offered by Virtual Reality techniques in creating new exploratory paths in the ancient world.

By following this approach, a bridge can be easily established between funerary archaeology and digital archaeology, and some common methodological issues that are worthy of consideration can be raised.

For the study of burial areas, the distribution of graves, and the relationship between cemeteries, settlements and territory, reference can be made to two core areas of digital archaeology. The first one involves spatial analysis techniques, i.e. the formal study of the aggregation and concentration processes and their mutual relationships through quantitative schemes and mathematical models that summarise the nature and essence of distribution phenomena.

The second area concerns the emergence of GIS and, with it, the new concept of space not only as a property concerning the physical location of material evidence but as an element to address the analysis of complex structures, in which soil morphology and human activities are essential components for the reconstruction of ancient land use dynamics and density. This includes elaborating digital terrain models that, taking advantage of the georeferencing process, facilitate distance calculation as well as viewshed and movement-based analyses.

For the study of specific funerary structures and burial typologies, ranging from megalithic tombs to Christian catacombs and beyond, the intervention of Information Technology has immediately turned towards computer graphics and then to Virtual Reality techniques. This sector of digital archaeology involves the processing of graphic data and its scientific visualisation, also thanks to the development of simulation techniques. Furthermore, it concerns the progress of the archaeology of architecture. Indeed, the study of historic built heritage finds in GIS systems an environment to record both planimetric and altimetric data sets, and in GIS and BIM integration a spatial context in which to move from the concept of geometric representation to the analysis of the information flow needed to describe it.

For the study of grave typologies and grave goods, archaeologists can once again rely on the heuristic potential of mathematical and statis-

tical analyses, both for their automatic classification through multivariate analysis techniques and for their chronological ordering through seriation techniques. As François Djindjian (2015) has pointed out, seriation is the most original method of automatic classification because it was designed by archaeologists for archaeologists[3] (trained by mathematicians) aiming to identify a chronological order within groups of objects based on their quantitative description (Ihm 2005). Indeed, the need for integration requires today to reconsider the relationship between funerary archaeology and seriation techniques from a global perspective, including the notion of 'topo-seriation' (Piergrossi, Tabolli, Pacifici 2019; on the use of Correspondence Analysis for seriation and topo-seriation purposes see Djindjian 1985).

Finally, as far as funerary rites are concerned, the role of computer science becomes more complex, as it implies the use of modelling and simulation techniques. The goal is to test mathematical models, often borrowed from systems theory and already applied in other cultural domains and disciplines, enabling the simulation and validation of features and behaviours of past ritual practices. Since the 1970s, this challenge in automated interpretation processes has also catalysed the attention of some new branches of archaeology, such as 'social archaeology', 'behavioural archaeology', and 'spatial archaeology'.

3. A historical survey for searching common archaeological roots

Once the main methodological aspects are outlined, attention can turn to the review of applications, starting with their historical roots. As previously noted, the merging of funerary archaeology and computational archaeology dates back to the 1960s, when both received a theoretical and methodological evolutionary impulse from the New Archaeology movement driven by the intensive application of mathematics and statistics. One of the earliest examples of quantitative analysis of archaeological data was precisely the numerical classification of La Tène fibulae from the Iron Age cemetery of Münsingen near Berne in Switzerland, promoted by Roy Hodson and conducted thanks to the joint work of a computer science specialist, James Doran, and a microbiologist, Peter Sneath (Hodson, Sneath, Doran 1966; Doran 1971).

[3] This statement matches the one on the homepage of the Bonn Archaeological Software [formerly Statistics] Package (BASP), «a non-profit software project for and by archaeologists which has been developed cooperatively since 1973» (https://baspsoftware.org/). For a recent application in a funerary archaeology study of the latest version of this software (WinBASP), which is no longer supported today, see Melandri 2011 (in particular, ch. 3).

Evidence of these early years can be found in the 'Virtual Museum of Archaeological Computing' (https://archaeologicalcomputing.lincei.it/), a result of an international project on the history of computer applications to archaeology initiated thanks to the close cooperation between the Accademia Nazionale dei Lincei and the Consiglio Nazionale delle Ricerche (Moscati, Orlandi 2019). During an in-home interview, Hodson himself recalls the first international conferences and work experiences promoted by interdisciplinary research teams and the not always straightforward dialogue between them: «Originally, I had no knowledge of computing and programming and I just provided data that was appropriate for other people to use, notably first Peter Sneath and then Jim Doran. My work in particular with Jim Doran and the publication of an article on the analysis of Palaeolithic assemblages involved a subject in statistics that the professor of pure mathematics and mathematical statistics of Cambridge, David Kendall, was very interested in»[4].

In order to launch the survey and provide an evolutionary overview, a series of freely accessible online tools, created as part of the research activities pivoting around the journal «Archeologia e Calcolatori», will be used[5]. First and foremost, we are referring to the 'Bibliographies' section of the Virtual Museum, whose consultation allows us to briefly sum up what occurred between the 1960s and the early 1990s.

Exploring the extensive bibliography edited by Arroyo-Bishop and Lantada Zarzosa (1993) – the only one with a truly international scope when compared to those edited by Ryan (1988) and Wilcock (1999), which mainly focused on the English-speaking environment – computer-based research on various aspects of funerary archaeology unfolds with a degree of quantitative consistency. Among the 2,880 titles published between the early 1950s and 1993, mathematical and statistical data analysis stands out in terms of the number of bibliographical references, whether applied to the study of spatial archaeological patterns, i.e. the distribution of burial areas and monuments (see, e.g., Gallay 1973 and 1987, for the megalithic necropolis of Petit-Chasseur in Sion - Valais, Switzerland), or to the numerical

[4] David Kendall, Professor of Mathematical Statistics at the University of Cambridge, was the first to develop a program package (the HORSHU-program) accomplishing a multi-dimensional scaling routine, which was used at the beginning of the 1980s by Barry J. Kemp to group together similar graves and sort several Egyptian cemeteries from the Dynastic and Predynastic periods. As Kemp stated, this computer program «produces, in other words, a Petrie 'sequence', although the technical term that has come to replace 'sequence' is 'seriation'» (Kemp 1982, 6). For the interview with F.R. Hodson see: http://archaeologicalcomputing.cnr.it/itineraries/category/protagonists/.

[5] It is impossible to provide an exhaustive list of titles on the subject here. However, it is possible to cite just a few references to projects that since the 1970s have marked the progress of scholarship in this area of close relationship between archaeology, anthropology, ethnography, and computer science, given their theoretical and methodological background.

analysis of specific classes of grave goods and their chronological evolution (see, e.g., Leredde 1982, for the Merovingian buckle-plates coming from north-eastern France).

Databases are also included, focusing on two aspects: the typological classification of objects and the cataloguing of archaeological funerary heritage. Among the earliest databases, we can mention the project on the Hellenistic funerary stelae from Thessaly, published in the Proceedings of the 1972 Marseille Conference *Les banques de données archéologiques*, edited by Mario Borillo and Jean-Claude Gardin (von Graeve, Helly, Wolters 1974). Of broader scope is Jeremy Jones' manual published by the Council of British Archaeology, in which the following questions are raised: why record graveyards, what to record, and how to analyse the data (Jones 1976), which subsequently encouraged several important graveyard surveys in the UK research agenda.

On the other hand, compared to today, computer graphics still needed to be developed, and applications mainly referred to the use of CAD software. Only from the 1990s onwards did the situation change due to the consolidation of digitisation strategies in all fields of investigation. In a nutshell, having acquired and cemented statistical knowledge over time and recognised the potential of databases for data storage and retrieval, expertise and innovation in the 1990s paved the way to developing new application horizons: GIS, the Internet, multimedia systems, and finally, Virtual Reality.

For this period, reference can be made to two additional bibliographical tools: the Bibliography of Archaeological Computing, which includes more than 2,700 titles covering the period between 1989 and 2000, and the repository of the journal «Archeologia e Calcolatori», which extends to the present day. While not aiming to be exhaustive, both tools make it possible to describe the scientific scenario from the 1990s onwards. In particular, the Bibliography of Archaeological Computing was analysed and contextualised in the first volume of the new publishing project entitled '30 anni di informatica archeologica', within the series 'Futuro anteriore' published by Edizioni All'Insegna del Giglio (Caravale, Moscati 2021). The results are quantitatively extensive and qualitatively wide-ranging to accompany the reader into the new Millennium.

4. The last decade: archaeology of death in the Etruscan digital cultural heritage

With these premises guiding the discussion, it is now possible to dwell on the distinctive features of the last decade. Supported by our recent research based on topic modelling and machine learning techniques to analyse the repository of «Archeologia e Calcolatori», we will provide some insights into

the cross-cutting and most topical themes that characterise digital archaeology today (Caravale *et al.* 2023).

Where possible, we will select examples from the Etruscan and Italic world, i.e. one of the cultural areas of reference for funerary archaeology mostly affected by computer applications, as confirmed by the papers presented at the workshop held in Venice. In addition, the recent IADI-Interactive Atlas of Digital Images project (https://iadi.archcalc.cnr.it/), which shows a gallery of over 4,000 images published in the journal since 1990, will help to follow the text through an iconographic filter.

4.1 *Etruscan cities and necropolises*

The groundwork for using GIS platforms to analyse Etruscan cities and cemeteries was laid at the turn of the second Millennium. In Cerveteri, as part of the Caere Project, one of the earliest GIS applications was developed (Moscati 1998). The analysis focused on the core of the Etruscan city as a result of the impressive work fostered in the 1980s by Mauro Cristofani on the urban plateau (Cristofani 1986). In addition, by experimenting with 3D digital terrain models, an intervisibility analysis between the urban plateau – using the exceptional north-western orientation of the Vigna Parrocchiale Temple as a reference point – and the monumental tumuli of the Banditaccia necropolis was performed. Observations were also made from an archaeo-astronomical perspective (Ceccarelli 2001; Moscati 2002).

Similarly, Tarquinia is among the best examples of this methodological renewal, according to a comprehensive approach stemming from the 'Tarquinia Project', conceived by Maria Bonghi Jovino in the 1980s (Bonghi Jovino 2010). Giovanna Bagnasco Gianni well summarised this approach in a 2017 article entitled *The last ten years of research in Tarquinia* (Bagnasco Gianni, Marzullo, Garzulino 2017). Once again, the GIS environment facilitated the task of integrating and sharing information of a different nature by embedding large data sets and by enhancing legacy data, such as the results of the geophysical surveys conducted by the Lerici Foundation.

The beginning of the year 2000 witnessed another large-scale project, which overturned the archaeological research approach centred in those years on large-scale excavations in urban areas. In the study of the Etruscan-Samnite site of Pontecagnano (SA), the primary source for reconstructing the historical phases of the settlement was represented by its extensive necropolis areas, where a program was started since the late 1990s to systematically cataloguing and mapping the whole tomb assemblages (Massanova, Pellegrino, in this volume). All these data were entered into a GIS database, and an interface was developed for the interactive analysis of the funerary contexts (D'Andrea 1999; Iacotucci, Pellegrino 2010; Pellegrino, Rossi 2017, with references).

This fruitful research season finds its fulfilment in integrating computer-based methods and digital tools, as illustrated in a recent article by Fernando Gilotta and the team working on the Monte Abatone Project (Gilotta *et al.* 2022). Once again, this is an area explored thanks to the Lerici Foundation surveys, the results of which have been georeferenced on a GIS platform. In addition, the extensive use of laser scanning and photogrammetry techniques has enabled the production of a 3D model of the Monte Abatone plateau, as well as of the Campana Tumulus and the other excavated tombs (Gilotta, Lucchetti, Patriziano, in this volume). In the last few years, the 3D reconstruction of monumental burial mounds has attracted particular attention in the Etruscan and Italic areas, including their interactive visualisation (Taccola *et al.* 2021; see also Gambacurta *et al.*, in this volume). The proposed models can complement the emerging BIM engineering approach that has recently been introduced in the infrastructure field (I-BIM systems or 'BIM for the Underground': Chapman 2020).

The application of digital photogrammetry and photo interpretation as an effective tool for cartographic restitution is at the core of another recent project focusing on the urban area of Vulci and the surrounding necropolis. Giorgio F. Pocobelli, together with a CNR interdisciplinary team, pushes experimentation even further through machine learning techniques (Cacciari, Pocobelli 2021). Representative examples in the Poggio Mengarelli area are illustrated to discuss the pros and cons of this innovative approach in automating and optimising archaeological crop-marks' identification processes[6].

The theme of funerary archaeology as a global approach to the death phenomenon in antiquity was consolidated in the journal «Archeologia e Calcolatori» in 2021 with the publication of an entire thematic section. *From Pottery to Context. Archaeology and Virtual Modelling*, edited by Vincenzo Baldoni (2021), builds on the archaeological analysis and virtual modelling of the Davanzali Picenian necropolis of the ancient emporion of Numana (Ancona). In a more comprehensive framework, archaeologists explore techniques for acquiring digital models of archaeological objects from funerary contexts and reconstructing the same contexts through three-dimensional modelling. It is definitively an original 'zooming out' approach from the object's scale to that of the landscape, passing through the dynamics of space occupation in the necropolis (Gaucci 2021).

[6] By referring to remote sensing techniques, highly impressive and worth of note is the very recent research conducted in the area of Veii, based on multispectral surveys with drones to detect vegetation anomalies caused by buried archaeological remains (Materazzi, Pacifici, Santaga 2024).

4.2 *Tombs and grave goods*

The main expectations from digital tools for the study of individual tombs or funerary monuments have been primarily fulfilled by surveying techniques (digital photogrammetry, remote sensing, laser scanning) and data restitution strategies (3D models, Virtual Reality, simulations, digital replicas), often developed within the framework of the archaeology of architecture. The challenge has been to design virtual models as digital repositories that not only contain visual representations but also the logical-deductive processes for their implementation.

The results are manifold. The most spectacular outcomes arise from the joint analysis of wall structures and tomb paintings in the Etruscan and Italic context. Worth mentioning is the long-lasting project ICAR (Iconographie et Archéologie pour l'Italie préromaine), which is illustrated in this volume in a special section dedicated to *Images antiques et humanités numériques* (Lubtchansky, Pimpaud 2024). Promoted by the ArScAn (Archéologie et Sciences de l'Antiquité) research group at the University of Paris Nanterre in 2000[7], the project was conceived as a database of the figurative scenes produced by Etruscan, Italic and Italiote peoples. The original research programme on 'Image and Religion in pre-Roman Italy' has since been enriched by implementing a multi-faceted approach to boost the integration and visual cross-referencing of graphical archive data and archaeological evidence. Moreover, '4D' models of Etruscan tombs are implemented and characterised by the association of spatial elements and temporal dimension (Cerchiai 2022).

Regarding grave goods, two different solutions can be described: the study and classification of specific classes of objects through the application of mathematical and statistical data analysis techniques and the use of databases to catalogue, systematise, and query information. In the first case, the analysis of Etruscan urns produced in Volterra was the focus of a project that began in the early 1990s (Moscati 1994). The project progressed from the initial application of descriptive and multidimensional statistical analysis (in particular, Multiple Correspondence Analysis) to testing methods and tools for knowledge management (Signore, Missikoff, Moscati 2005). The ultimate goal was to reconstruct a social history from life and afterlife data, including customers' choices and artisans' workshops.

Within the realm of cinerary urns production in northern Etruria during the Hellenistic period, the 'Charun' database project, published

[7] Over the years, the ArScAn research group has implemented several programs based on the shared database model (Guimier-Sorbets 1999). Among others, with reference to funerary archaeology, the noteworthy EMA ('L'enfant et la mort dans l'Antiquité') database of child graves in antiquity (Fromageot-Laniepce 2012), which evokes a research subject that has recently been addressed also for pre-Roman Italy (Govi 2021).

on the Internet by Francesco De Angelis (2005), was truly innovative. It collected data on both urns and tombs, allowing users to start their query process either from a specific urn and the tomb in which it was found, or from a particular set of grave goods. The information gathered and centred on the monuments from Chiusi formed the basis for a subsequent analytical study that led to the publication, in 2015, of the volume *Miti greci in tombe etrusche. Le urne cinerarie di Chiusi* in the series Monumenti Antichi dei Lincei (De Angelis 2015).

The illustration of the computerised analysis of individual funerary objects would require a dedicated section. These applications are characterised by image processing and animation techniques and have often been realised on the occasion of temporary exhibitions or for enjoyment in real or virtual museums (see lastly Boschi 2022, with references). For instance, one of the earliest examples of the virtual reconstruction of an orientalising princely cart in motion was designed for the new set-up of the Ny Carlsberg Glyptotek in 2005 (Emiliozzi, Moscati, Santoro 2007; for this Italic masterpiece, now exhibited at the Archaeological Museum in Fara in Sabina, see also Betori, Licordari 2021). Similarly, as part of the European project Etruscanning, the virtual reconstruction of the Regolini-Galassi tomb in Cerveteri and its funerary goods was one of the first examples of immersive reality and a new frontier in the communication and learning processes created at the Vatican Museums (Pietroni 2013).

This experiment was the result of some previous interactive experiences developed on the one hand as part of the UNESCO website of the Etruscan Necropolises of Cerveteri and Tarquinia (Nista, Natale, Moscati 2010), and on the other hand for the multimedia project by Piero Angela and Paco Lanciano exhibited in the Caere National Museum in 2013 and recently refurbished. Furthermore, it was the starting point for subsequent developments, such as those displayed today on the website of the e-Archeo project promoted by the Ministry of Culture (https://e-archeo.it/en/cerveteri/). The Caeretan virtual tour in the Banditaccia necropolis also includes the visualisation of the 3D model of the Sarcophagus of the Spouses, which is the subject of one of the most appreciated virtual reconstructions showed during the exhibition *Il viaggio oltre la vita. Gli Etruschi e l'aldilà tra capolavori e realtà virtuale* at Palazzo Pepoli in Bologna in 2014-2015 (Russo Tagliente, Sassatelli 2014).

Concerning recent exhibitions, *Spina etrusca. Un grande porto nel Mediterraneo* commemorates the 100th anniversary of the discovery of the Etruscan city of Spina (Desantis *et al.* 2023). During the visit, videos and multimedia immersive installations enhance audience enjoyment. Spina, with its cemeteries and rich grave goods, as well as being focal in defining the earliest phases of development and monumentalisation of funerary spaces in

the Po Delta area (Gaucci 2015; Govi *et al*., in this volume), consolidates among the general public its status of communication and trade hub in the network of the main cities of the Mediterranean and classical-era Greece.

4.3 *Revitalised or innovative scientific approaches*

In conclusion, two less investigated facets of the convergence between funerary archaeology and computer science will be mentioned: the analytical study of funerary practices as a focal point for simulating ancient societies, and the research domain of 'archaeo-thanatology' as a comprehensive solution for integrating data from funerary archaeology and biological anthropology.

The use of Agent-Based Modelling (ABM) to simulate complex dynamics of ancient communities and their social organization, although not new (Doran 1970; Hodder 1978), is the most articulated approach. In funerary archaeology, the analysis of the 'social dimension of mortuary practices' (Saxe 1970) should include the actors as well as the archaeological evidence of their attitude towards death and the mortuary ritual, in order to shed light on the social structure of the groups that buried their dead. Such a paramount analysis – today also influenced by the 'actor-network theory' concerning the interaction concept (Latour 2005; Nizzo 2017) – would perfectly apply to the multifaceted examples of Spina or Pontecagnano (see, e.g., Donnellan 2019) that we have already illustrated.

The second investigation area has developed thanks to the involvement in the research teams of experts in biological anthropology and palaeopathology. Significantly, archaeo-thanatology is strongly oriented towards the concept of the dead and its relation to contemporary society (Williams, Giles 2016). It requires specific operative aspects because the recovery, study, and exposition of archaeological human remains raise the question, still partially explored, of the ethical issues related to their analysis, curation, and display (Arizza 2021, with references). The intervention of information technology is fundamental here for its cross-cutting nature that supports and integrates interdisciplinary activities to operate both in the field and in the laboratory, as well illustrated on the INRAP website, in the section 'Les Magazines' (https://www.inrap.fr/magazine/Les-magazines/), under the title *L'archéo-anthropologie funéraire*. Regarding the analysis and classification of human remains, the role of archaeometry and the statistical approach are still prevalent.

5. Conclusion

Funerary archaeology, as well as digital archaeology, are today characterised by a global approach, supported by technological tools, which embraces both cultural and natural heritage to provide alternative ways of interpreting the archaeological record.

Going back to the terminological issues, this global approach is corroborated by the spreading of some newly coined words that have entered the archaeological language and, therefore, are especially useful in identifying innovative research phenomena. I refer, in particular, to the terms 'necrogeography', 'necroscapes' or 'deathscapes' (e.g., Semple, Brookes 2020), which relate to a broader spectrum of research drawing on geography, sociology, and anthropology. They well describe the need for a Collaborative Virtual Research Environment (CVRE) that mimics fieldwork and laboratory-scale studies, in which data and tools to process them are made available for researchers cooperating on the same topics.

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ABSTRACT

The paper explores the successful merging of expertise in 'funerary archaeology' and 'digital archaeology' research domains. The Author first conducts a terminological analysis to establish a framework for both subjects based on their unique theoretical and methodological backgrounds and then highlights common methodological issues from the 1960s up to today. The result is a complex scenario in which the main applications include spatial analysis techniques and the GIS-based approach for the study of the relationship between cemeteries, settlements and territory; computer graphics and Virtual Reality techniques for the reconstruction of specific funerary structures and burial typologies; multivariate statistical analyses for the automatic classification of grave goods and their chronological ordering; modelling and simulation techniques to mimic features and behaviours of past ritual practices.