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*Archeo.FOSS XIV 2020: Open software, hardware, processes,
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Archaeopress Archaeology, Oxford 2021 | Book review***

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Bogdani J., Montalbano R., Rosati P. (eds.), *Archeo.FOSS XIV 2020: Open software, hardware, processes, data and formats in archeological research: Proceedings of the 14th International Conference (15-17 October 2020)*, Archaeopress Archaeology, Oxford 2021.

The volume *Archeo.FOSS XIV 2020*, edited by Julian Bogdani, Riccardo Montalbano and Paolo Rosati, was published by Archaeopress Archaeology in 2021 and it collects the proceedings of the 14th international conference held on 15-17 October 2020 on the World Wide Web. Since 2006 the *Archeo.FOSS* annual convention has been an important moment of argumentation and updates regarding the most modern approaches and applications of free and open-source software solutions related to archaeology and more generally to the Cultural Heritage, establishing itself as a unique pioneering event. What stands out within this volume is undoubtedly the presence of an important space dedicated to open data and open standards solutions in archaeology and the ever-increasing difficulties of all those scholars who strongly believe in the possibilities offered by this type of approach but who are still too few to consider it an urgent necessity of the entire academic community. Data sharing with reusable information in open platforms, published on the World Wide Web and distributed under open licences, is the main theme of the conference. The book strongly emphasises these needs, and it has been released in an open-access format using a CC BY-NC-ND 4.0 International Licence, in keeping with the spirit of the 14th *Archeo.FOSS* conference, responding to the new stimuli of discussion, data access and information sharing needed by today's scholars, researchers and beyond.

The need for an open methodology comes to light in the methodological approach of many of the papers presented: today's archaeological subject needs to deal with a lot of information from multidisciplinary research, collected with various tools that need to be organised but also well managed to be understandable. In fact, in many of the contributions, historical or archaeological knowledge is a starting point for the promotion of open systems and formats. The book begins with a general overview of the conference by the editors Julian Bogdani, Riccardo Montalbano and Paolo Rosati, who offer a perspective on the objectives, achievements and future plans for the *Archeo.FOSS* community from the changes imposed by the situation in which the 14th conference took place. The 17 papers presented are organised in two sections with an appendix. The first section, entitled "Use, Application and Development of Free/Libre and Open-Source (FLOS) Tools in Archaeology", collects contributions based on case studies

and the development of tools and workflows. The second section, entitled “Creation, Use and Promotion of Open Data and Open Formats in Archaeology”, is dedicated, in more detail, to the issue of open data.

Use, Application and Development of Free/Libre and Open-Source (FLOS) Tools in Archaeology

The first part of the volume is characterized by the presence of case studies that exemplify different digital solutions of data interchange in archaeology. As mentioned in the general foreword, multidisciplinary integration is the common thread of the contributions in the volume, underscored by the examples that will be mentioned, each one different in purposes but all sharing similar needs. Nowadays it is no longer enough to speak about multipurpose databases ready to catalogue and document cultural heritage or of GIS systems and WebGIS as if they were only storage units. In the papers presented it is concretely manifested that now the definition of innovative (an adjective more often than ever overused unjustifiably) and interdisciplinary approaches passes through a comparison of technologies and well-thought-out integrations that culminate in a defined, shared and declared workflow. It is in this perspective that the papers presented wanted to go and they can be divided in turn into thematic areas starting from the most up-to-date techniques of image acquisition and processing such as the integration of RTI (Reflectance Transformation Imaging) technique for the documentation of palaeo-mesolithic visual culture with a case study experimented by Michele Pellegrino and Donato Coppola in the site of Grotta di Santa Maria in Agnano (Ostuni, Italy). The non-invasive analysis through multi-lighting tests of RTI has led the scholars toward multidisciplinary methodological considerations and reflections that meet the needs of graphic documentation on prehistoric visual culture. Other remarks arise from remote sensing acquisitions for monitoring threats related to soil erosion to generate risk maps from an integrated assessment that considers the presence of archaeological deposits. The study, led by Stefano De Angeli, Fabiana Battistin, Federico Valerio Moresi, Philip Fayad and Matteo Serpetti, presents the results achieved by the methodology proposed by the RESEARCH project (REmote SEnsing techniques for ARCHaeology) in Falerii Novi (Viterbo, Italy) with an integrated and effective workflow that considers archaeological and geological/environmental data through analysis conducted with open-source software and scenario simulations by testing plug-in specifically designated to process data from GPR prospections. The work by Emanuele Brienza, Giovanni Caratelli, Lorenzo Fornaciari and Cecilia Giorgi on Rome – NE Palatine slopes goes instead into depth on the theme of the relationship between the archaeological fieldwork and the sharing of the complex set of information that fed the interpretative process of hypothesis of the everyday work. The data of the work team are shared with citizens, according to a WebGIS form of Cultural Heritage management, in line with the idea of an accessible archaeology and beyond. They manage data from long archaeological research and they experienced the possibility of renewing methods for collecting and sharing information focusing on 3D survey and on GIS systems for building archaeology data released with an open licence. In the same vein as the previous two examples on visual documentation, it is possible to set an interchange of technologies for processing 3D models and orthophotos from thermographic images taken by drone presented by Gabriele Ciccone. The paper interestingly deals with the replicability of the technology, something that is never secondary when it comes to methodologies and workflows documented. After all, the archaeological research has the great need to represent the data in space as an integral part of the research

itself, without which it is not even possible to formulate reconstructive hypotheses of settlements, mobility, structures, materials. In this, GIS systems represent the backbone of the digital humanities applied to archaeology, continually endowed with plug-ins that increase their exploitation possibilities for the purposes of the topographic research. In this light, the paper of Renata Ago and Domizia D'Erasmo about the urban mobility in 18th-century Rome sets a further example. If GIS is commonly used to analyse big data of urban mobility in modern cities, it's very interesting to see how it can be useful to examine kinds of movements in historical times. Thanks to an integrated workflow made up of historical georeferenced cartography and written sources of ceremonial and private paths, the results of the analysis of the vectorization in the GIS platform are different heatmaps of the most trafficked zones in the 18th-century Rome. A similar need for the representation and the comprehensibility of data is what emerges in the research that sees the extension software's potential applied to cases concerning archaeology of architecture as set out in the paper presented by Filippo Diara and Fulvio Rinaudo. The case study of the refectory of the Cistercian abbey of Staffarda (Saluzzo, Italy) is the protagonist of a project focused on experimentations and adaptations of FreeCAD FOS software, released with a GNU GPL v2 licence, as an HBIM platform for the documentation and analysis of building archaeology. The work by Paolo Rosati, instead, introduces the debate and the still open reflections on the Faro Convention, with a special care for the impact its adoption has on small museums by presenting case studies of institutions and cultural events held between 2018 and 2021 in Central Italy. Further evolutions of GIS technologies are explored by the geospatial investigations presented by Augusto Palombini in which the georelational model of data organisation becomes the basis for analysis processes. The paper outlines a case study of landscape archaeology applied to the middle Tiber Valley with the aim of identifying the areas with the highest potential in terms of agricultural use related to Roman settlements of the middle and late Imperial era through the creation of a new GRASS-GIS tool. Finally, a very interesting approach is the inclusion of Linked Open Data (LOD) within GIS projects to enrich geospatial data sets with semantic information. Examples are provided by Timo Homburg and Florian Thiery using two different archaeological contexts showing how spatial LOD can be published: the Limes data set with forts and watchtower along the Germanic Limes and the public road network in Roman Britain.

Creation, Use and Promotion of Open Data and Open Formats in Archaeology

As already mentioned, specific attention in the conference was placed on the ongoing matter of the use of open data in archaeology. The second part of the volume is dedicated to the creation and promotion of open data and open formats in archaeological research. The need for data exposure and sharing emerges clearly in eight papers presented. From large European projects and initiatives such as ArchAIDE, SITAR and PATHs to museum institutions, the specific focus of the session goes beyond the concept of open software solutions to proposals for the creation of distributed platforms with free licences, designed to be digital archaeological archives open to all. The paper presented by Francesca Anichini and Gabriele Gattiglia focuses on the open-data policy and the management of material covered by copyright of the ArchAIDE project. The consideration is almost obliged by the fact that there are stringent European directives on copyright and database protection: the project thus aimed at creating outputs that take copyright into account and do not alter the open nature of the output. Then in the direction of an archaeology that is open to a wider public, thus increasing education in the knowledge of cultural heritage, its protection and its

valorisation, moves the SITAR project, presented here by Mirella Serlorenzi, Ascanio D'Andrea and Riccardo Montalbano. SITAR is a long-term project that in the last few years has released a new open data platform for a public archaeology in Rome. Data are provided under a CC-BY-SA 4.0 licence with an open approach to external users according to a hierarchy of different types of interactions with the institution of the Soprintendenza Speciale Archeologia Belle Arti e Paesaggio di Roma. Two contributions are dedicated to the issue of Linked Open Data (LOD), used to interlink data within the World Wide Web semantically. On the one hand, the work of Florian Thiery, Sophie C. Schmidt and Timo Homburg leads directly to the technical core of the creation and publication of archaeological data in the Semantic Web providing two ways to model data using the example of Irish Ogham Stones in Wikidata as LOD with descriptions of protocols and workflows. On the other hand, the team based in the Catania University and composed by Nicola Lanieri, Rodolfo Brancato, Salvatore Cristofaro, Marianna Figuera, Marianna Nicolosi Asmundo, Daniele Francesco Santamaria, Daria Spampinato presents a paper with the results of the digitisation of the Libertini Collection of the Museum of Archaeology of the University of Catania (MAUC) where digital data are associated with sites and objects. The focus is based on the exploitation of the Web Ontology Language (OWL) looking forward for a long-term preservation of digital data that still an important aspect to consider when projects are intended to be durable and inclusive, especially in the case of a museum created to be experienced. The paper presented by Julian Bogdani, instead, deals with the problem of the digitisation and vectorisation of archaeological and/or architectonic graphical legacy documentation. This contribution focuses on the Simple Vectorisation Protocol (SVP), a GIS-based protocol for acquiring in the digital domain sketches and maps by following a syntax for reverse engineering and archive data, born in the context of PATHs, an ERC Advanced project directed by P. Buzi at Sapienza University of Rome. In the end the result shows a multidimensional dataset, publishable on online repositories, re-usable and remixable depending on strategies and necessities of every single archaeological project. The attempting of an overview on the management of spatial information of archaeological data available online but in a non-open format is the main theme of the contribution presented by Andrea D'Andrea and Francesca Forte. The analysis and comparison of open and non-open spatial formats for archaeological research deal with the matter of how non-open data can be re-used in different platforms to extend the dissemination of projects. The paper stresses the importance of the use of open standards with a practical test on a dataset for archaeological areas in the Lazio territory downloaded by the Open Data portal of Lazio Region in the section Piano Territoriale Paesistico Regionale (PTPR), made of points, lines, and polygons in shapefile format, demonstrating concretely the advantages of using formats, such as GeoJSON. The work by Alessandra Caravale, Alessandra Piergrossi and Irene Rossi presents the Open Data, Open Knowledge, Open Science research group at the CNR-ISPC. The team includes archaeologists, philologists, mathematicians, and computer scientists who share editorial work around the open-access journal *Archeologia e Calcolatori* showing FAIR guiding principles and the aims of the use of LOD in this case study. One of the most important aims achieved by the research group is the experimentation of protocols and strategies useful to share scientific resources, publications, or datasets, with a focus on the area of the Heritage Science. In the same light it is possible to set the contribution by Mario Ciurcina and Piergiiovanna Grossi that deals with an overview on the recent evolution of technologies that contributed to the process of data opening in the domain of Cultural Heritage. Starting from a brief introduction about Italian laws concerning data related to Cultural Heritage, examples of main projects have been presented and discussed.

The volume closes with an appendix, by Julian Bogdani and Federico Sciacca, which takes the form of an introspective analysis of the activity of the Archeo.FOSS community since its inception, conducted on a statistical basis of the reports of the proceedings of the annual conferences with special reference to the vitality, or otherwise, of the projects presented over the years and to the way in which the conference proceedings were published.

Undoubtedly, once again, what characterises the proceedings of the 14th edition of Archeo.FOSS is the philosophy of the open approach, which is well underlined by this volume's focus on the aspects of communication and data sharing that are fully in line with the goals that the Archeo.FOSS community has set itself. All contributions develop themes that over time the group of scholars and researchers revolving around the Archeo.FOSS conferences has openly committed to spread, such as the culture of sharing protocols, data and software reuse for archaeology and Cultural Heritage.