MEDIEVALISTA

N.º 38 | Julho – Dezembro 2025
ISSN 1646-740X

Blended Intensive Program *Unveiling Medieval Monastic Dynamics* (M_Dyn)

Blended Intensive Program *Unveiling Medieval Monastic Dynamics* (M_Dyn)

Rolando Volzone

ISCTE-University Institute of Lisbon, Centre for Socioeconomic and Territorial (DINÂMIA'CET-Iscte), Lisbon, Portugal
1649-026 Lisboa, Portugal
Universidade Nova de Lisboa, Faculdade de Ciências Sociais e Humanas, Instituto de Estudos Medievais, Lisboa, Portugal
1069-061 Lisboa, Portugal

rolando_volzone@iscte-iul.pt
https://orcid.org/0000-0002-1555-866X

Data recepção do artigo / Received for publication: 12 de Junho de 2025

DOI: https://doi.org/10.34619/tukm-vt8v

Monastic heritage can only be fully understood through an integrated approach that begins with the built structures and extends to the surrounding landscape[1]. This encompasses both natural and cultural systems, namely, the result of human interaction with vegetation, soil, water, etc.[2].

Medieval monastic landscapes today face numerous preservation challenges, stemming from historical and sociocultural transformations. In Western Europe, the process of secularization, heightened by the dissolution of religious orders in the 19th century, led to a profound rupture, resulting in a vast number of buildings and landscapes, being significantly altered or entirely abandoned[3].

Understanding and managing these monastic spaces is often hindered by the poor state of preservation of physical remnants and the lack of visual or graphical documentation, of both the constructions and the surrounding landscapes.

To advance the understanding of the dynamics between architectural and landscape heritage, the Institute for Medieval Studies at the Faculty of Social Sciences and Humanities of NOVA University Lisbon hosted, in 2024, the Blended Intensive Program (BIP) *Unveiling Medieval Monastic Dynamics (M_Dyn)*. This was part of the research project by Rolando Volzone, titled *Unveiling Contemporary Lessons from Medieval Monastic Environments*, funded by the Foundation for Science and Technology (FCT) through programmatic support granted to the research center.

A genuinely interdisciplinary approach was adopted, bringing together different fields of knowledge to foster a deeper understanding of the past and present. Medieval history and

[1] VOLZONE, Rolando; FONTES, João Luís Inglês – "The Portuguese eremitical Congregation of the Serra de Ossa: spatial analysis of the monastic settlements". *Journal of Medieval Iberian Studies* 12:1 (2020), pp. 84-105.
[2] VOLZONE, Rolando; FONTES, João Luís Inglês; CARAPINHA, Aurora da Conceição Parreira – "Toward the Reconstruction of Sacred Medieval Spatialities: Multiscale Analysis of the System of Eremitical Landscapes in Southern Portugal from Historical Records". *Historical Archaeology* 57 (2023), pp. 764-787.
[3] VOLZONE, Rolando; GENIN, Soraya – "The Legacy of Franciscan Observance Convents in Portugal: Overview of Their Reuse Towards Sustainable Development". In NIGLIO, Olimpia (ed.) – *Regenerating Cultural Religious Heritage*. Singapore: Springer, 2022, pp. 129-140.

architecture, represented by the Institute for Medieval Studies (NOVA FCSH), joined forces with landscape and ecological knowledge from the University of Évora. Also contributing were the architectural heritage expertise of the Department of Architecture and Design (DAD) from Politecnico di Torino, the engineering and computational sciences of the Drawing Architecture Document Action (DAda Lab) from the Department of Civil Engineering and Architecture (DICAr) of the University of Pavia, and the archaeology and digital humanities of the Science and Technology in Archaeology and Culture Research Center (STARC), from The Cyprus Institute.

The BIP brought together 21 participants from different countries, attending undergraduate, master's, and doctoral programs at the participating institutions, representing a wide range of disciplines including history, art history, architecture, landscape studies, archaeology, engineering, and cultural heritage.

This diverse academic background enriched the learning environment and supported the program's main goal: to develop a didactic approach to studying religious landscapes, with the aim of understanding their diachronic evolution since the Middle Ages, as well as their past and present values. The course equipped students with the knowledge and skills needed to analyze historical landscapes through a combination of i) theoretical lessons and ii) practical activities, blending in-person and remote methods and employing both traditional and digital technologies[4].

i) Theoretical classes were held online on September 2 and 9.

Spanning different time periods, geographies, and methodologies, the lectures on the first day offered immersion in the richness and complexity of medieval monastic experiences and their present-day echoes. João Luís Fontes[5] recounted the history

[4] VOLZONE, Rolando; NIGLIO, Olimpia; BECHERINI, Pietro – "Integration of knowledge-based documentation methodologies and digital information for the study of religious complex heritage sites in the south of Portugal". *Digital Applications in Archaeology and Cultural Heritage* 24 (2022). https://doi.org/10.1016/j.daach.2021.e00208

[5] João Luís Fontes is an Assistant Professor of Medieval History at the Faculty of Social Sciences and Humanities, NOVA University of Lisbon. His research focuses on medieval religious history, with particular emphasis on late medieval eremitical movements and other currents of religious renewal,

of religious life, tracing a path from early Christian hermits[6] to coenobitic monasticism, spiritual reforms, mendicant movements[7], and informal urban and rural religiosity in the late Middle Ages. These diverse practices and architecture shaped a deeply rooted spiritual universe that transformed the inhabited spaces. This intimate relationship between spirituality and territory was central to many of the presentations. Rolando Volzone[8] explored how religious communities shaped – and were shaped by – the places they inhabited, blending documentary analysis with digital technologies to reconstruct nearly invisible uses and landscape structures.

Nikolas Bakirtzis[9] took participants to Cyprus, where painted churches in the Troodos Mountains[10] bear witness to centuries of artistic, spiritual, and cultural exchanges in the Mediterranean. Mia Trentin[11] analyzed historical graffiti on the

including the development of Franciscan Observant settlements. Further information is available at: https://orcid.org/0000-0002-7122-4357.

[6] FONTES, João Luís Inglês – *Génese e institucionalização de uma experiência eremítica: da «pobre vida» à Congregação da Serra de Ossa (1366-1510)*. Lisbon: Imprensa Nacional-Casa da Moeda, 2021.

[7] FONTES, João Luís Inglês; ANDRADE, Maria Filomena; RODRIGUES, Ana Maria S. A. – "La(s) reforma(s) en el franciscanismo portugués en la edad media". *Hispania Sacra* 72:145 (2020), pp. 51-63.

[8] Rolando Volzone is an Italian architect and researcher based in Lisbon, affiliated with DINÂMIA'CET-Iscte (Iscte–University Institute of Lisbon) and the Institute for Medieval Studies (IEM) at NOVA University of Lisbon. His research explores the transformative impact of cultural heritage on territories and communities, extending beyond the architectural object. In recent years, he has focused primarily on religious heritage from a multidisciplinary perspective, integrating medieval, modern, and contemporary history with architecture, landscape architecture, public policy, and community engagement. Further information is available at: https://orcid.org/0000-0002-1555-866X.

[9] Nikolas Bakirtzis is Associate Professor at The Cyprus Institute in Nicosia and Director of the Andreas Pittas Art Characterization Laboratories. His research and publications concentrate on Byzantine monasticism, medieval urbanism and fortifications, as well as the insular landscapes of the Byzantine, Medieval, and Early Modern Mediterranean. More recently, his work has addressed questions of heritage and cultural identity in historic urban contexts. Further information is available at: https://orcid.org/0000-0002-4081-9331.

[10] ABATE, Dante; FAKA, Marina; TOUMBAS, Kyriakos; BAKIRTZIS, Nikolas; MITCHELL, William; COLLS, Kevin; STURDY-COLLS, Caroline – "Multi-modal digital documentation and visualization of the UNESCO painted churches in Troodos (Cyprus)". *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS Archives)*, XLVI-2/W1-2022 (2022), pp. 1-8.

[11] Mia Trentin is a Research Associate at the Digital Heritage Research Lab, Cyprus University of Technology. Trained as an archaeologist and historian, she specializes in digital humanities, with particular focus on digital documentation, ontologies, and data structuring. A Fellow of the Society of Antiquaries of London, her research investigates Medieval and Early Modern written and visual culture through both traditional scholarly approaches and digital methodologies. Further information is available at: https://orcid.org/0000-0002-6650-3132.

same island as living records of the faithful's interaction with religious buildings: informal practices that often escape traditional sources[12]. Religious retreat spaces also required practical, sophisticated solutions for habitability. Ester Penas González[13] demonstrated this through her analysis of the hydraulic systems in female Cistercian monasteries in the Iberian Peninsula[14]. The separation of potable and non-potable water circuits, adapted to topography and local resources, reveals everyday engineering serving both seclusion and liturgy. Francesca Picchio[15] presented multiscale digital documentation strategies applied to monastic complexes, showing how 3D models can bridge formal analysis and heritage management[16].

Digital tools played a prominent role, highlighting technology's growing impact on research and heritage preservation. Fulvio Rinaudo[17] emphasized the need to

[12] TRENTIN, Mia Gaia – "Medieval and Early Modern Graffiti in Eastern Mediterranean: A New Methodological Approach". In ŠKRABAL, Ondřej; MASCIA, Leah; OSTHOF, Ann Lauren; RATZKE, Malena (eds.) – *Graffiti Scratched, Scrawled, Sprayed: Towards a Cross-Cultural Understanding.* Berlin, Boston: De Gruyter, 2023, pp. 383-422. https://doi.org/10.1515/9783111326306-013; TRENTIN, Mia Gaia; ALTARATZ, Doron; CAINE, Moshe; RE'EM, Amit; TINAZZO, Andrea; GASANOVA, Svetlana – "Historic Graffiti as a Visual Medium for the Sustainable Development of the Underground Built Heritage". *Sustainability* 15(15):11697 (2023). https://doi.org/10.3390/su151511697

[13] Ester Penas González holds a PhD in Archaeology from the Autónoma University of Madrid (2023). She currently holds a research contract at the National Historical Archive, funded by the Royal Association of Hidalgos of Spain. She is a member of the MUNARQAS Project and the Archaeonat Research Group at the Autónoma University of Madrid. Her research focuses on the history and archaeology of female Cistercian monasticism in Castile, as well as medieval and early modern hydraulic systems. Further information is available at: https://orcid.org/0000-0001-9705-6630.

[14] PENAS GONZÁLEZ, Ester – "El agua en un monasterio cisterciense femenino: motivos para el estudio de un sistema hidráulico". *CISTERCIUM Revista de historia, arte y espiritualidad* 75:282 (2024), pp. 11-48.

[15] Francesca Picchio is Associate Professor of Architectural Representation at the Department of Civil Engineering and Architecture, University of Pavia. Since 2023, she has served as the scientific coordinator of research projects promoted by the DAda Lab at the same institution. Her work focuses on architectural and urban documentation, with the aim of promoting architectural and landscape heritage through the development of virtual access tools and digital database management systems. Further information is available at: https://orcid.org/0000-0002-8072-584X.

[16] PICCHIO, Francesca; GALASSO, Francesca – "Documentar, explorar y representar la armonía monástica. Estrategias integradas de prospección digital para el conocimiento y la conservación del conjunto monumental de la "Certosa" de Pavía". *Mimesis.Jasd* 4:3 (2024), pp. 91–98.

[17] Fulvio Rinaudo is Full Professor of Geomatics at the Department of Architecture and Design, Politecnico di Torino. He is President-elect of the ICOMOS International Scientific Committee CIPA Heritage Documentation (2024–2027). His research focuses on innovative methodologies in photogrammetry, laser scanning, and GIS for cultural heritage, as well as on the application of artificial intelligence to heritage documentation. His work also encompasses HBIM, multi-spectral and geophysical analysis, and video photogrammetry for historical architecture, contributing

integrate metric and non-metric data – ranging from physical measurements to historical texts and images – into coherent, shareable digital systems[18]. Francesco Novelli[19] addressed the challenges of repurposing underused religious heritage, using the Santa Chiara convent in Turin as an example of how memory, sustainability, and reuse can align to serve community needs once more[20]. Gianmario Guidarelli[21] examined how, in the 15th century, monasteries of the Congregation of Santa Giustina consciously integrated the surrounding landscape into their spiritual architecture, creating a new humanist-inspired monastic aesthetic. Maria Soler[22] and Marc Ferrer[23] showcased the potential of GIS, spatial

significantly to the fields of Digital Humanities and Urban History. Further information is available at: https://orcid.org/0000-0002-9592-1341.

[18] RINAUDO, Fulvio; SCOLAMIERO, Vittorio – "Comparison of multi-source data, integrated survey for complex architecture documentation". *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS Archives),* Sci., XLVI-M-1-2021 (2021), pp. 625-631.

[19] Francesco Novelli, architect and Ph.D., is Associate Professor of Architectural Restoration at the Department of Architecture and Design (DAD), Politecnico di Torino. A specialist in the history, analysis, and evaluation of architectural and environmental heritage, he teaches both theoretical courses and design studios within the Architecture degree programs. His research focuses on the restoration of architectural heritage, with particular attention to the protection and conservation of religious and fortified architecture, as well as on strategies for adaptive reuse and enhancement in complex restoration projects. Further information is available at: https://orcid.org/0000-0002-8936-0621.

[20] NOVELLI, Francesco – "Conventi e monasteri nel centro storico di Torino, nuovi usi e riusi". In NOVELLI, Francesco; PICCOLI, Edoardo (ed.) – *Santa Chiara a Torino. Conservare un convento nel XXI secolo.* Genove: Sagep Editori, 2024, pp. 34-45.

[21] Gianmario Guidarelli is Assistant Professor (tenure track) in Architectural History at the University of Padua, within the Department of Civil, Environmental and Architectural Engineering. His research explores the intersections of architecture, liturgy, and theology, with particular focus on the Venetian cathedral of San Pietro di Castello (8th–17th century), the architecture of Cassinese Benedictine abbeys during the Renaissance, and the built environment of the Venice Ghetto. Further information is available at: https://orcid.org/0000-0001-8850-5895.

[22] Maria Soler is Associate Professor of Medieval History and Archaeology at the University of Barcelona. She specializes in the study of medieval monastic landscapes and is recognized as a pioneer in the application of digital mapping methodologies, spatial analysis, and Geographic Information Systems (GIS) to the investigation of spiritual landscapes. Her contributions to the field include numerous articles in high-impact journals and chapters in volumes published by leading academic presses. Further information is available at: https://orcid.org/0000-0002-1521-172X.

[23] Marc Ferrer holds a Ph.D. in Medieval History from the University of Barcelona (2019), with a dissertation centered on the application of spatial analysis and Geographic Information Systems (GIS) to the study of the early Middle Ages. He has participated as a researcher and team member in numerous national and European projects focused on historical and cultural heritage. His research interests lie primarily in the study of medieval territory and landscape, with a strong emphasis on digital humanities. Further information is available at: https://orcid.org/0000-0003-1655-9741.

databases, and interactive mapping to analyze monastery locations, visibility, and accessibility, revealing power strategies and territorial integration[24].

To close the theoretical component, three technical masterclasses introduced students to digital survey methods, equipment for data collection, and software for processing and interpretation. Raffaella De Marco[25], Silvia La Placa[26], and Francesca Galasso[27] presented innovative digital surveying methods combining built heritage and landscape using drones, LiDAR[28], and mobile sensors, capturing not only architectural forms but also ecological and symbolic relationships[29]. Bento

[24] FERRER, Marc – "El análisis de clústeres aplicado en la organización territorial de los asentamientos medievales del siglo XI en el Baix Montseny (España)". *Revista de Humanidades Digitales* 8 (2023), pp. 49-73; SOLER, Maria – "Puntos, Líneas y Polígonos. Mapear los espacios de dominio monástico en la Edad Media". *H2D|Revista De Humanidades Digitais*, 6:1, (2024), pp. 1-18.

[25] Raffaella De Marco is an engineer and architect, from the Department of Civil Engineering and Architecture (DICAr), University of Pavia. Her research focuses on the development of databases and reality-based models for cultural and endangered heritage, aimed at informing conservation, valorisation, and management protocols in alignment with international policy frameworks. Since 2022, she has been the Principal Investigator of the MSCA project *MOEBHIOS – Multi-attribute values' OntologiEs to improve Built Heritage InformatiOn assessment in cluStered territories*, which seeks to develop advanced digital mapping protocols for the architectural, archaeological, social, and economic parameterisation and valorisation of cultural clusters. Further information is available at: https://orcid.org/0000-0002-4857-3196.

[26] Silvia La Placa holds a Ph.D. in Design, Modeling, and Simulation in Engineering and is currently a research fellow at the Department of Civil Engineering and Architecture (DICAr), University of Pavia, working on the project Development of Historical Heritage Databases and Models. Her research focuses on the documentation of architectural and landscape heritage, with particular attention to the survey and classification of architectural and territorial contexts and the development of digital databases to support heritage analysis and management. Further information is available at: https://orcid.org/0000-0001-9792-932.

[27] Francesca Galasso holds a Ph.D. in Design, Modelling, and Simulation in Engineering and is a Research Fellow at the Department of Civil Engineering, University of Pavia. Her research focuses on digital modelling for virtual environments that support the valorization of historical architectural heritage. Since 2014, she has contributed to national and international projects on architectural documentation, developing 3D models and databases for immersive and augmented reality applications aimed at dissemination and public engagement. Further information is available at: https://orcid.org/0000-0003-0264-2755.

[28] LiDAR stands for Light Detection and Ranging. It's a technology that uses laser light to measure distances. It can capture the shape of landscapes, buildings, or forests with high accuracy.

[29] GALASSO, Francesca – "Comparative data processing methods: analysis and considerations on photogrammetric outputs obtained from UAV. The case study of the facade of the Church of the Certosa di Pavia". In BARBA, Salvatore; PARRINELLO, Sandro; LIMONGIELLO, Marco; DELL'AMICO, Anna (eds.) – *D-SITE, Drones - Systems of Information on culTural hEritage. For a spatial and social investigation.* Pavia: Pavia University Press, 2020, pp. 208-2017; LA PLACA, Silvia; DORIA, Elisabetta – "Digital documentation and fast census for monitoring the university's built heritage". *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS Archives)*, XLVIII-2/W4-2024 (2024), pp. 271–278; DE MARCO, Raffaella – "The spiritual architecture of Maqamat: From the digitisation of Architectural Heritage sites to the enhancement of

Caldeira[30], Pedro Trapero-Fernández[31], and Rui Oliveira[32] demonstrated geophysics applied to archaeology – specifically ground-penetrating radar and magnetic methods – as effective, non-invasive tools to detect buried structures and hydraulic networks vital for heritage protection and interpretation[33]. Finally, Valentina Vassallo[34] introduced a semantic model for preserving at-risk heritage, using the Agios Ioannis Lampadistis monastery in Cyprus as a case study. She combined tools such as HBIM with ontologies and metadata to enable informed, sustainable heritage management[35].

cultural memory through virtual narratives". *Cidades, Comunidades e Territórios* SP25 "Religious Heritage – sites, people, challenges" (2025), pp. 64-83.

[30] Bento Caldeira is Professor at the Department of Physics at the University of Évora, as well as a researcher at the Institute of Earth Sciences. His research focuses on seismology and internal geophysics, including seismic source analysis, rupture modeling, seismicity, seismotectonic, and seismic tomography. He also works on the inversion of seismic and geodetic data (InSAR and GPS), seismic instrumentation, and network development. His interests extend to applied geophysics, particularly in natural resource exploration and archaeological prospecting. Further information is available at: https://orcid.org/0000-0003-4745-6972.

[31] Pedro Trapero-Fernández is a Margarita Salas Postdoctoral Researcher at the University of Cádiz. His work focuses on the study of ancient and contemporary spaces in Spain and Portugal, with a particular emphasis on Roman rural landscapes. He applies technologies such as Geographic Information Systems (GIS), remote sensing, and applied geophysics to explore spatial relationships and patterns of agricultural and livestock production. Further information is available at: https://orcid.org/0000-0001-5808-054X.

[32] Rui Oliveira holds a Ph.D. in Earth and Space Sciences from the University of Évora in 2020, focusing on geophysics applied to archaeology. He is a member of the Earth Remote Sensing Laboratory (EaRSLab), an integrated researcher at the Institute of Earth Sciences-Évora, and serves as director of the Portuguese Association of Meteorology and Geophysics. His research spans geophysics applied to archaeology and geology, seismology, and remote sensing. Further information is available at: https://orcid.org/0000-0003-4114-7570.

[33] CALDEIRA, Bento; OLIVEIRA, Rui Jorge; TEIXIDÓ, Teresa; BORGES, José Fernando; HENRIQUES, Renato; CARNEIRO, André; PEÑA, José Antonio – "Studying the Construction of Floor Mosaics in the Roman Villa of Pisões (Portugal) Using Noninvasive Methods: High-Resolution 3D GPR and Photogrammetry". *Remote Sensing* 11(16):1882 (2019); TRAPERO-FERNÁNDEZ, Pedro – "Conditions for vine cultivation in Roman times through the columella and GIS". *Revista de Estudios Andaluces*, 41 (2021), pp. 25-46; OLIVEIRA, Rui Jorge; TRAPERO-FERNÁNDEZ, Pedro; CALDEIRA, Bento; BORGES, José Fernando; CARNEIRO, André – "Studying the Water Supply System of the Roman Villa of Pisões (Beja, Portugal) Using Ground-Penetrating Radar and Geospatial Methods". *Remote Sensing* 15:1447 (2023). https://doi.org/10.3390/rs15051447.

[34] Valentina Vassallo is a postdoctoral researcher at The Cyprus Institute. Her research focuses on developing multidisciplinary solutions for the integration, management, and communication of 3D digital cultural heritage data, emphasizing metadata, ontologies, and semantic frameworks. She is currently working on knowledge-based approaches for heritage at risk, contributing digital and interdisciplinary methodologies to cultural heritage preservation. Further information is available at: https://orcid.org/0000-0002-0456-9769.

[35] VASSALLO, Valentina; THEODORIDOU, Maria; FELICETTI, Achille; AVGOUSTI, Avgoustinos – "Tools and Ontologies for the Aggregation and Management of Cypriot Archaeological Datasets". *Internet Archaeology* 64 (2023). https://doi.org/10.11141/ia.64.10

Together, these presentations not only reconstructed spiritual geographies and hydraulic networks, but also proposed new ways to read, document, and valorize religious heritage. By integrating history, archaeology, architecture, digital technologies, and landscape studies, they demonstrated that sacred spaces still challenge us today, as testaments of the past and as questions for the present. While the first day of lectures showcased the research potential of digital technologies, the second day focused on the technical aspects of how to use them.

Figure 1. Aerial view of the former convent of Nossa Senhora da Saudação in Montemor-o-novo. ©Raffaella De Marco, 2024.

ii) On-site activities took place from September 15 to 20, in Montemor-o-Novo, Portugal.

The program began with a guided tour of the town center by Montemor-o-Novo municipality staff. This was essential to understand the territorial structure and its relationship with the selected case study: the former Convent of Nossa Senhora da Saudação (Figure 1), dissolved in the late 19th century and repurposed several times since. At the time of the BIP, the convent was closed and awaiting renovation.

A process to which the findings from this intensive week would certainly contribute. It was visited on the second day, following a lecture by Prof. João Luís Fontes on the importance of historical documentation for understanding medieval monastic communities, and a specific presentation on the community of hermits and later Dominican nuns who founded the convent.

Participants, divided into three groups with diverse geographic and disciplinary backgrounds, tackled three main guiding questions (Qs):

Q1. To understand the diachronic evolution of the built structures through their construction systems, focusing on the ground floor. This included the church, cloister, adjacent conventual rooms (kitchen, refectory, chapter house, early cells), and the enclosure area.

Q2. To reveal the network formed by the hydraulic system, mainly composed of underground water collection and distribution structures. This also involved understanding its relation to landscape water features, especially natural springs and the nearby stream.

Q3. To analyze vegetation systems from the convent's enclosed areas to the stream zone, aiming to trace a diachronic analysis of vegetation over time.

For each question, the following approaches were taken:

1. Documentary analysis: parchments, historical maps, mid-20th-century aerial photos, prior historical studies, and existing surveys (translated and shared with participants).

2. New documentation: created through traditional and 3D digital surveys. Q1: terrestrial and aerial laser scanning, photogrammetry, hand drawing. Q2: ground-penetrating radar and terrestrial photogrammetry. Q3: laser scanning and photogrammetry (aerial and terrestrial), and walkover surveys.

3. Data integration and interpretation. Q1: stratigraphic analysis of building systems. Q2: 2D and 3D reconstructions of water flows. Q3: vegetation mapping.

Figure 2. Digital surveys techniques for aerial, terrestrial and underground documentation. Equipments: Matrice 350 RTK with ZENMUSE L2, Leica BLK2GO, Ground Penetrating Radar (top, from left to right); 3D point could from aerial laser scanning, point cloud from terrrestrial laser scanning, revealing of underground data (bottom, from left to right). ©Rolando Volzone, 2024.

The students actively participated, helping develop content that reinterpreted and added meaning to these medieval monastic environments, both in understanding their past and promoting their present-day significance. Under tutor supervision, all engaged with the available equipment: aerial data was collected with LiDAR and drones; terrestrial data through cameras, 360-degree cameras, GoPros, and handheld or fixed terrestrial laser scanners; and underground data via georadar (some examples are presented in the Figure 2).

In just a few days, participants carried out practical activities focused on analyzing medieval archival documents from historical, cultural, and ecological perspectives; acquired, managed, and analyzed digital survey data; and interpreted and visualized

it in various ways: virtual tours, navigable digital models, thematic animated maps, and reuse proposals based on a deeper understanding of original functions.

Medieval monastic heritage sites, while rooted in their religious function, hold far-reaching significance for understanding the cultural and environmental evolution of Western societies. These spaces serve as living archives, encapsulating centuries of knowledge in architecture, construction practices, landscape management, and hydraulic engineering. As such, they offer not only insights into the past but also critical lessons for the sustainable stewardship of cultural and natural resources today.

Acknowledgements

This study was made possible thanks to the support of the Municipality of Montemor-o-Novo, which granted access to the case study site, provided several of the archival sources analyzed, and shared the recent report on the archaeological excavations. The involvement and engagement of the students throughout the course also played a key role, particularly in the analysis and interpretation of the collected data.

Bibliographical references

Studies

ABATE, Dante; FAKA, Marina; TOUMBAS, Kyriakos; BAKIRTZIS, Nikolas; MITCHELL, William; COLLS, Kevin; STURDY-COLLS, Caroline – "Multi-modal digital documentation and visualization of the UNESCO painted churches in Troodos (Cyprus)". *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS Archives)* XLVI-2/W1-2022 (2022), pp. 1-8. https://doi.org/10.5194/isprs-archives-XLVI-2-W1-2022-1-2022.

CALDEIRA, Bento; OLIVEIRA, Rui Jorge; TEIXIDÓ, Teresa; BORGES, José Fernando; HENRIQUES, Renato; CARNEIRO, André; PEÑA, José Antonio – "Studying the Construction of Floor Mosaics in the Roman Villa of Pisões (Portugal) Using Noninvasive Methods: High-Resolution 3D GPR and Photogrammetry". *Remote Sensing* 11(16): 1882 (2019). https://doi.org/10.3390/rs11161882

DE MARCO, Raffaella – "The spiritual architecture of Maqamat: From the digitisation of Architectural Heritage sites to the enhancement of cultural memory through virtual narratives". *Cidades, Comunidades e Territórios* SP25 "Religious Heritage – sites, people, challenges" (2025), pp. 64-83. https://doi.org/10.15847/cct.39778

FERRER, Marc – "El análisis de clústeres aplicado en la organización territorial de los asentamientos medievales del siglo XI en el Baix Montseny (España)". *Revista de Humanidades Digitales* 8 (2023), pp. 49-73. https://doi.org/10.5944/rhd.vol.8.2023.37318

FONTES, João Luís Inglês – *Génese e institucionalização de uma experiência eremítica: da «pobre vida» à Congregação da Serra de Ossa (1366-1510)*. Lisbon: Imprensa Nacional-Casa da Moeda, 2021.

FONTES, João Luís Inglês; ANDRADE, Maria Filomena; RODRIGUES, Ana Maria S. A. – "La(s) reforma(s) en el franciscanismo portugués en la edad media". *Hispania Sacra* 72:145 (2020), pp. 51-63. https://doi.org/10.3989/hs.2020.004

GALASSO, Francesca – "Comparative data processing methods: analysis and considerations on photogrammetric outputs obtained from UAV. The case study of the facade of the Church of the Certosa di Pavia". In BARBA, Salvatore; PARRINELLO, Sandro; LIMONGIELLO, Marco; DELL'AMICO, Anna (eds.) – *D-SITE, Drones - Systems of Information on culTural hEritage. For a spatial and social investigation.* Pavia: Pavia University Press, 2020, pp. 208-2017.

GUIDARELLI, Gianmario – "La formazione di una cultura architettonica comune della congregazione di Santa Giustina nel XV secolo: cantieri, normativa e soluzioni spaziali". In FURLAN, Elisa; TROLESE, Francesco (eds.) – *Dalla riforma di S. Giustina alla Congregazione cassinese. Genesi, evoluzione e irradiazione di un modello monastico europeo (secc. XV-XVI).* Cesena: Centro Storico Benedettino Italiano, 2022, pp. 701-716.

LA PLACA, Silvia; DORIA, Elisabetta – "Digital documentation and fast census for monitoring the university's built heritage". *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS Archives)* XLVIII-2/W4-2024 (2024), pp. 271–278. https://doi.org/10.5194/isprs-archives-XLVIII-2-W4-2024-271-2024

NOVELLI, Francesco – "Conventi e monasteri nel centro storico di Torino, nuovi usi e riusi". In NOVELLI, Francesco; PICCOLI, Edoardo (ed.) – *Santa Chiara a Torino. Conservare un convento nel XXI secolo.* Genova: Sagep Editori, 2024, pp. 34-45.

OLIVEIRA, Rui Jorge; TRAPERO-FERNÁNDEZ, Pedro; CALDEIRA, Bento; BORGES, José Fernando; CARNEIRO, André – "Studying the Water Supply System of the Roman Villa of Pisões (Beja, Portugal) Using Ground-Penetrating Radar and Geospatial Methods". *Remote Sensing* 15:1447 (2023). https://doi.org/10.3390/rs15051447

PENAS GONZÁLEZ, Ester – "El agua en un monasterio cisterciense femenino: motivos para el estudio de un sistema hidráulico". *CISTERCIUM Revista de historia, arte y espiritualidad* 85:282 (2024), pp. 11-48.

PICCHIO, Francesca; GALASSO, Francesca – "Documentar, explorar y representar la armonía monástica. Estrategias integradas de prospección digital para el conocimiento y la conservación del conjunto monumental de la "Certosa" de Pavía". *Mimesis.Jasd* 4:3 (2024), pp. 91–98. https://doi.org/10.56205/mim.4-3.12

RINAUDO, Fulvio; SCOLAMIERO, Vittorio – "Comparison of multi-source data, integrated survey for complex architecture documentation". *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS Archives)* Sci. XLVI-M-1-2021 (2021), pp. 625-631. https://doi.org/10.5194/isprs-archives-XLVI-M-1-2021-625-2021

SOLER, Maria – "Puntos, Líneas y Polígonos. Mapear los espacios de dominio monástico en la Edad Media". *H2D|Revista De Humanidades Digitais* 6:1 (2024), pp. 1-18. https://doi.org/10.21814/h2d.6110

TRAPERO-FERNÁNDEZ, Pedro – "Conditions for vine cultivation in Roman times through the columella and GIS". *Revista de Estudios Andaluces* 41 (2021), pp. 25-46. https://dx.doi.org/10.12795/rea.2021.i41.02

TRENTIN, Mia Gaia – "Medieval and Early Modern Graffiti in Eastern Mediterranean: A New Methodological Approach". In ŠKRABAL, Ondřej; MASCIA, Leah; OSTHOF, Ann Lauren; RATZKE, Malena (eds.) – *Graffiti Scratched, Scrawled, Sprayed: Towards a Cross-Cultural Understanding.* Berlin, Boston: De Gruyter, 2023, pp. 383-422. https://doi.org/10.1515/9783111326306-013

TRENTIN, Mia Gaia; ALTARATZ, Doron; CAINE, Moshe; RE'EM, Amit; TINAZZO, Andrea; GASANOVA, Svetlana – "Historic Graffiti as a Visual Medium for the Sustainable Development of the Underground Built Heritage". *Sustainability* 15(15): 11697 (2023). https://doi.org/10.3390/su151511697

VASSALLO, Valentina; THEODORIDOU, Maria; FELICETTI, Achille; AVGOUSTI, Avgoustinos – "Tools and Ontologies for the Aggregation and Management of Cypriot Archaeological Datasets". *Internet Archaeology* 64 (2023). https://doi.org/10.11141/ia.64.10

VOLZONE, Rolando; FONTES, João Luís Inglês – "The Portuguese eremitical Congregation of the Serra de Ossa: spatial analysis of the monastic settlements". *Journal of Medieval Iberian Studies* 12:1 (2020), pp. 84-105. https://doi.org/10.1080/17546559.2019.1652838

VOLZONE, Rolando; FONTES, João Luís Inglês; CARAPINHA, Aurora da Conceição Parreira – "Toward the Reconstruction of Sacred Medieval Spatialities: Multiscale Analysis of the System of Eremitical Landscapes in Southern Portugal from Historical Records". *Historical Archaeology* 57(2023), pp. 764-787. https://doi.org/10.1007/s41636-023-00414-2

VOLZONE, Rolando; GENIN, Soraya – "The Legacy of Franciscan Observance Convents in Portugal: Overview of Their Reuse Towards Sustainable Development". In NIGLIO, Olimpia (ed.) – *Regenerating Cultural Religious Heritage*. Singapore: Springer, 2022, pp. 129-140. https://doi.org/10.1007/978-981-19-3470-4_9

VOLZONE, Rolando; NIGLIO, Olimpia; BECHERINI, Pietro – "Integration of knowledge-based documentation methodologies and digital information for the study of religious complex heritage sites in the south of Portugal". *Digital Applications in Archaeology and Cultural Heritage* 24 (2022). https://doi.org/10.1016/j.daach.2021.e00208

COMO CITAR ESTE ARTIGO | HOW TO QUOTE THIS ARTICLE:

VOLZONE, Rolando – "Blended Intensive Programme *Unveiling Medieval Monastic Dynamics* (M_Dyn)". *Medievalista* 38 (Julho – Dezembro 2025), pp. 457-472. Disponível em https://revistas.fcsh.unl.pt/medievalista.