Report – Summer School Tech4Heritage
Monteverde / Ravello, 20–25 October 2025

_Tech4Heritage Summer School: Objectives and Structure

From 20 to 23 October 2025, the *Tech4Heritage Summer School* took place in the Municipality of Monteverde (AV). The final stage of the training plan was held on 24 and 25 October, with the participation of the students in *Ravello Lab 2025* – an international forum focused on the theme “Tourism and Culture”.

The Summer School, fully funded by the PA Foundation, aimed to explore the role of new technologies in the management and enhancement of cultural heritage - both tangible and intangible - understood as a legacy to be protected and transmitted to future generations. The educational program combined theoretical and practical components: specialized lectures on advanced technologies delivered by academics and professionals, along with practical workshops in which digital tools for the enhancement of cultural sites in real contexts were designed and developed. These objectives proved essential given the wide range of disciplinary backgrounds represented among the participants, enabling the construction of a shared, interdisciplinary approach to heritage protection and innovation.

_Development of the Tech4Heritage Training Programme

The program unfolded as follows:

On 20 October, activities began with the presentation of the training project by Prof. Fabio Pollice (Rector of the University of Salento), who outlined the methodological foundations previously mentioned, stressing the concept of cultural heritage as an asset to be transmitted to guarantee *intergenerational equity* through efficient planning at all levels. This was followed by the lecture of Prof. Giorgio De Nunzio, Professor of Applied Physics for Cultural Heritage, Environment, Biology and Medicine at the University of Salento. The professor demonstrated how artificial intelligence - specifically the *Machine Learning* and *Deep Learning* subsets - can contribute to knowledge acquisition, preventive conservation and, consequently, improved accessibility and enjoyment of cultural heritage. The session concluded with a hands-on activity using an online platform that applies *Machine Learning* methodologies.

The second part of the first day featured the lecture of Prof. Lucio Tommaso De Paolis, Professor of Extended Reality at the University of Salento. He addressed the theme of *extended reality* technologies applied to the user experience of cultural heritage, illustrating case studies -mainly focused on the Salento region, but not exclusively - where heritage elements are integrated into interactive digital environments designed to amplify user engagement. The session encouraged a constructive dialogue with the students, centered on the possibilities offered by immersive technologies to support the creation of true digital museums: tools capable of encouraging physical visits to cultural heritage sites while simultaneously removing physical and semantic barriers, thus enabling more inclusive and informed cultural participation.

To conclude the first day, Prof. Sara Nocco, Professor of Economic Geography of Tourism at Università Telematica UniPegaso - who accompanied the students throughout the

Summer School by providing scientific and organizational support - delivered a lecture on *Digital Placetelling* and *Food Storytelling*. She highlighted how territorial identity can be interpreted and communicated through food products and digital media. In particular, she illustrated the potential of *digital storytelling* to enhance the connection between a product and its place of origin, positioning the territory not as a mere background element but as an essential component of the product itself. In this perspective, the day ended with a training visit to a brewery in Monteverde, where students experienced a concrete example of local production rooted in the territory. The brewery represents a symbol of community identity, recognized as an excellence of the local production chain and a tangible demonstration of the role played by tangible and intangible heritage in promoting tourism and cultural development.

The second day opened with a new lecture by Prof. Lucio Tommaso De Paolis on the theme of *Digital Twin* and smart environments for cultural heritage. The professor examined the concept of the *digital twin* as a dynamic replica of the physical artefact, created through extended reality technologies and advanced data acquisition systems. Unlike the original object - static and often difficult to access - the *Digital Twin* enables continuous monitoring of the artefact's condition, supports planning for potential future interventions, and allows for clearer visualization of structural and material components. It is therefore a tool serving both preventive conservation and informed cultural appreciation.

The following session was delivered by Prof. Giovanni d'Errico, researcher at the University of Salento, who examined *Human–Computer Interaction technologies* for the enhancement of cultural heritage. He presented various solutions, some already widely adopted and others emerging, used both within museums and in the design of cultural itineraries. These included tactile 3D models, essential for accessibility for visually impaired users, and proximity systems such as *NFC* and *Beacon* technologies, enabling more direct and personalized interaction with cultural content.

The second day concluded with the lecture of Prof. Mario Angelelli, Professor of Quantitative Methods and Multidimensional Data Analysis at the University of Salento. He presented advanced digital tools for processing and interpreting complex surveys, crucial for obtaining a complete and structured understanding of data collected in the field. These tools serve as a valuable support for narrating villages and cultural sites, transforming data into useful insights for heritage promotion and strategic planning.

The third day began with the lecture of Prof. Gianpaolo Ghiani, Professor of Automated Planning and Decision Support Systems at the University of Salento. The professor explored techniques of Artificial Intelligence applied to automated planning, showing how these methodologies can be used to optimize tourist flows and personalize the visitor experience. As an example, he presented a recent project aimed at developing a virtual tourist assistant based on a chatbot capable of generating personalized itineraries according to visitors' preferences.

After a brief introduction to the fundamentals of Machine Learning, with particular focus on the distinction between discriminative and generative models, several application cases were presented: from advanced facial and voice recognition systems to generative AI solutions, up to robotics for cultural heritage enhancement. The final part of the session took place in *Python*, where students experimented with artificial intelligence through two practical exercises. The first explored a recommendation engine based on collaborative filtering, designed to estimate tourists' preferences regarding attractions in Paris and suggest two unvisited sites. The second allowed students to integrate, via *API key*, a *Large Language Model* - specifically *Gemini* - into a text generation program.

In the afternoon, Prof. Sara Nocco returned to delve into the role of digital technologies in the construction and dissemination of territorial narratives, with a specific focus on the enhancement strategies of small Italian villages. Central to the discussion were the concepts of *cyberplace* and *on-life*, illustrating how the physical and digital dimensions merge in contemporary territorial experiences. The professor also presented the methodologies of *Digital Placetelling*, which integrate storytelling, experiential tourism and territorial marketing to strengthen local identity through participatory and multisensory narratives. Among the case studies analyzed, special attention was given to the "Borgo Universo" project in Aielli (AQ) and to the network "I Borghi più belli d'Italia", recognized as successful examples of cultural regeneration and increased tourist attractiveness through narrative expressions of territorial heritage.

The third day ended with the lecture of Laura Corchia, researcher in Digital Cultural Heritage at the University of Salento, who introduced students to *3D modelling* and *photogrammetry* applied to cultural heritage. After explaining the fundamental principles and briefly presenting her portfolio - including the digital reconstruction of *Porta Rudiae* - students engaged in practical work using Blender software, producing their first three-dimensional models. The session concluded with an overview of photogrammetry techniques and their main fields of use, demonstrated through the visualization and 3D printing of a digitally reconstructed statue.

The fourth and final day in Monteverde opened with the lecture of Carola Gatto, researcher in Digital Cultural Heritage at the University of Salento, who led the students through a digital documentation activity in the field. Following a demonstration on the use of a 360° camera, participants captured audiovisual content and conducted interviews aimed at creating a virtual and interactive experience of the village. The collected materials were later processed through *ThingLink*, a platform that enables the development of immersive and multimedia cultural experiences.

The training activities concluded with a session dedicated to the beta testing of VATE, an application developed by the company *Gematica* to support intelligent access to cultural heritage (currently active only in the city of Lecce). CEO Marco De Angelis presented the main features of the application and invited students to actively contribute to its improvement by testing it and providing feedback regarding usability, content, and performance. The direct exchange with the development team fostered a constructive collaboration, highlighting the central role of users in technological innovation processes applied to cultural heritage.

On Friday 24 and Saturday 25 October, the participants of the Tech4Heritage Summer School joined the 20th edition of the Ravello Lab - the international forum hosted in the prestigious setting of Villa Rufolo in Ravello (SA), dedicated to the theme *Tourism & Culture for Place Regeneration*. Among the three thematic panels, the students attended Panel 1,

Italy's Small Villages and Inland Areas, chaired by Prof. Fabio Pollice, Rector of the University of Salento.
Friday morning was devoted to presentations and discussions led by experts from various fields. They debated strategic issues concerning the future of inland areas, enriching the session with case studies, best practices and professional insights. These contributions served the broader objective of shaping the final recommendations produced by the *Ravello Lab*.
During the afternoon session, the students took an active role by presenting the outcomes of the Summer School activities. The session was attended by Ms. Wenyan Jiang and Prof. Wei Shyy, respectively President and Board Member of the funding organization, *PA Foundation*. The day concluded with a summary by Prof. Pollice, who announced that the final remarks would take place the following morning.
On Saturday 25 October, the Presidents of the three panels presented the synthesis of their work: Prof. Fabio Pollice for Panel 1; Prof. Pierpaolo Forte for Panel 2, *Cultural Productions for Transformations*; and Dr. Marcello Minuti for Panel 3, *Italian Capitals of Culture: Practices and Impacts Ten Years After the Establishment of the Title*. The session offered a comprehensive overview of the perspectives developed during the forum regarding tourism, culture, and the regeneration of places.

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