



### A97 Digital Technologies and Forensic Archaeology: Reflections on the Experiences of the Committee of Missing Persons in Cyprus

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After attending this presentation, attendees will better understand the potential of digital forensic archaeological methods to: (1) improve search efficiency and accuracy; (2) ease access to various environments; (3) inform and create a more accurate record of elements recovered during subsequent excavations; and, (4) provide data outputs suitable for presentation to both experts and non-experts.

This presentation will impact the forensic science community by demonstrating how the combination of traditional investigation and excavation methodologies with digital forensic archaeological methods can affect the outcome of a missing person investigation and how new approaches to searching and documentation of unmarked clandestine burials may be applied around the world.

Using the example of the research undertaken in Cyprus, the objective of this presentation is to demonstrate the application of innovative digital technologies in a forensic archaeological environment and to highlight the pros and cons of interdisciplinary approaches compared with more traditional methods. Because this research was comprised of two distinctive areas of applied digital forensic technologies — those used for the identification of potential excavation sites by means of Non-Destructive Analysis (NDT), and those exploited for the documentation of the excavation process of exhumation sites — both will be included in this presentation. The combination of traditional investigation and excavation methodologies with digital sciences enables the project team to reflect upon the specific forensic needs of the Committee on Missing Persons (CMP) future strategic planning program and to highlight how such approaches may be applied at other unmarked clandestine burials around the world.

Since forensic archaeology became a recognized discipline in the mid-1990s, there have been considerable advances in the search for and recovery of human remains and other trace evidence. An increased appreciation of the role of archaeologists means that, in some countries, they are regularly engaged in forensic cases involving missing persons in the course of legal proceedings. Moreover, in many countries throughout the world, there have been pledges made to locate deceased and missing people for humanitarian purposes, with the main goal of ensuring that they receive the “basic dignity” of a formal burial and of providing answers for their families.

The CMP in Cyprus is a bi-communal body that was established in 1981 by the leaders of the Greek-Cypriot and Turkish-Cypriot communities, with the participation of the United Nations. The objective of the CMP is to determine the fate of 2,000 missing persons who have disappeared since the beginning of the inter-communal fighting of 1963-1964 and the events of 1974. So far, the remains of 1,192 individuals have been exhumed; 740 people have been identified. The locations of the burials of the remainder of these missing persons remains unidentified.

In 2017, a research project was launched between archaeologists, forensic experts, and digital technologists from the CMP, the Cyprus Institute, and the Centre of Archaeology at Staffordshire University (United Kingdom) to explore how tools from a range of disciplines could be utilized to detect and record individual and mass burials from the aforementioned periods of conflict. During this project, a wide range of methods were tested to identify appropriate emerging technologies and scientific applications that could be implemented in forensic scenarios now and in the future. A pyramidal approach was chosen, exploiting different devices mounted on aerial and terrestrial platforms. These included the use of Un-Manned Aerial Vehicles (UAV) coupled with image-based modeling techniques to create Digital Elevation Models (DEM), Digital Surface Models (DSM), and high-resolution ortho-photos. This methodology provided a first assessment of surviving anomalies, both in terms of surface geometry and vegetation growth, that may indicate the presence of burials. This approach was followed by geophysical surveys of selected areas to accurately scan the subsoil and identify and characterize potential underground targets (including potential burial sites). The fusion and visualization of this data was then undertaken alongside more traditional means of witness interviews and excavation.

#### Forensic Archaeology, Digital Technologies, Missing Persons