Executive Leadership Development in Heritage Management Workshops

Digital Tools for Cultural Heritage Management

Dates: 16 May - 10 June 2022

Online Training Program

Summer School Director:
Dr Evangelos Kyriakidis | Director, HERITAGE

Summer School Instructor:
Dr Cornelis Stal | Lecturer/Researcher HOGENT, HERITAGE Digital

A. Introduction

The Heritage Management Organization, in close collaboration with HOGENT (Belgium) has organized three integrated and consecutive specialist courses on various topics in geomatics to help heritage managers in their work:

• GIS
• Photogrammetry and images-based 3D modelling
• Laser scanning

In previous years, this summer school was organized in the municipality of Nafplio, aiming at the documentation of the most historically significant structures in the city center. With support of the European Erasmus+ program, we were able to successfully organize our program in an online setting. This year, we will make the edition even better, more interactive and hands-on with new lectures, demos and exercises.

As a participant, you will directly implement the newly obtained skills by implementing them in your own cultural heritage projects. A laptop, internet connection and a digital camera will be the starting point to record data of artefacts, properly orient them to one another in virtual space, and georeference the data collect to ultimately create a computer-generated representation of your study area, accompanied with contextual spatial data analysis results. These skills are essential in heritage management for any restoration, documentation or visualization project.
B. Course Objectives

This field school will introduce students to a broad range of 3D recording and mapping techniques, as well as methodologies to use and analyze spatial data. Participants will be provided with hands-on instruction in these methods with hands-on demos and exercises at various study areas. GIS will be used to publish the data in cartographic deliverables, and to use spatial data in for management and analysis. As a participant, you will work on provided data, but you will also record your own artefact, architectural remain, … using online spatial data and image-based 3D modelling. These data will be processed in appropriate software. Finally, laser scanning data will be provided by the instructors, but point cloud processing will be elaborated based on the image-based 3D modeling. Participants should be able to work in the digitization of any site following this work.

The summer school comprises of three specialist courses from 16 May – 10 June 2022:

- General introduction and installation
- GIS
- Photogrammetry and image-based 3D modelling
- Terrestrial laser scanning
- Q&A for full-program participants

Within the different courses, multiple days will be reserved for individual field work, data processing, and other exercises.
One can attend the whole summer school or anyone of these specialist courses as standalone training. Please get in touch with info@heritagemanagement.org for further information and arrangements on booking the specialist courses individually.

C. Prerequisites

There are no prerequisites for this field school. The course will be organized in an online environment, and as a participant, you will be asked to go in the field to acquired data about an object of your own choice. Safety, privacy, copyright, …, and COVID regulations should be respected at all times.

D. Grading Matrix

All students will be marked on a percentage basis as follows:

- **20%**: Terrestrial laser scanning: presentation of a processed point cloud in a browser-based environment, provided with a technical report on the data acquisition and processing;
- **20%**: GIS: GIS-based map and report-based acquisition, management and analysis of spatial data;
- **20%**: Photogrammetry and image-based 3D modelling: presentation of an image-based 3D model and orthophoto plan, provided with a technical report on the data acquisition and processing;
- **40%**: Essay/report handed in one month after the end of the summer school (3000-4000 words).
For those only taking part in some sections of the field school the grading will be adjusted to include only those sections you participate in.

E. Instructor

Dr Cornelis Stal is a lecturer and researcher at the HOGENT University of Applied Sciences and Arts and Ghent University (Belgium), where he is working on surveying engineering, geomatics and image-based 3D modelling. Within the framework of his research, he has participated in various archaeological and anthropological field campaigns, where the topics of this workshop are empirically implemented in an interdisciplinary context.

F. Description of the Specialist Courses

Specialist course 1: GIS

During the last century, an enormous amount of data, such as overview inventories, detailed stone plans, conservation monitoring records, buildings and landscape surveys, etc., has been recorded on cultural heritage sites all over the world. When these data are combined with spatial data, through GIS, heritage managers are able to solve complex problems. This specialist course covers the use of GIS in cultural heritage management using open source software. Important aspects of the transformation of manuscript plans to a full geographical database will be discussed and demonstrated, followed by hands on implementation of these techniques. Furthermore, the use of GIS for cartographic purposes will be expounded upon. After this course, the participant will be able to undertake a large variety of spatial challenges in a heritage management environment.

Specialist course 2: Photogrammetry and images-based 3D modelling

3D models, orthophotos or point clouds are indispensable tools for the documentation and monitoring of our heritage and allow a better understanding of the objects under research. The construction of these products is based on various concepts in photography, photogrammetry and computer vision, which are available via easy-to-use software and generally available hardware. During this specialist course, various techniques will be addressed and demonstrated during lectures and hands-on field work. Participants will get familiar with various digital tools (photography, photogrammetry, 3D modelling and model referencing, 360° photography, and vectorization by covering the entire workflow from image
acquisition via data processing to model publishing. After this workshop, participants will be able to apply these techniques in a wide range of applications (heritage management, archaeology, curatorial work etc.), concerning the various parameters for high quality 3D models and orthophotos.

Specialist course 3: Terrestrial laser scanning

Terrestrial laser scanning offers a fast and accurate methodology to generate dense geometrical representations of objects. This specialist course aims to get a thorough understanding of the principles of terrestrial laser scanning and best-practice application of this technique for the acquisition of point clouds. Based on on-site measurements and intensive practical sessions, participants will obtain necessary experience to apply this technique in their own field work and research. The focus of this course is put on the creation of applications for 3D recording of archaeological sites for conservation purposes. Research is also conducted on procedures and techniques to optimize the acquisition and to generate deliverables covering heritage sites. Among others, these deliverables are conventional maps, 3D models and online visualizations.

G. Course schedule and topics

Initial start-up

- Overview of the HMO, project, objectives and organization of the specialist courses
- Social event and virtual ice breaker

Specialist course 1: GIS

- Participant welcome and installation SC1
- Introduction to GIS, QGIS, data styling
- Geo-referencing, data generation, use of web-services
- Labels, data queries, publishing maps
- Combining data, geo-processing
- GIS and 3D

Specialist course 2: Photogrammetry and images-based 3D modelling

- Participant welcome and installation SC2
• Introduction to photography, photogrammetry, image-based 3D reconstruction

• Field work, data processing, introduction to referenced 3D modelling (topography, processing workflow)

• Field work, data processing, publishing 3D models (online, offline)

• Field work, data processing, integrating image-based models in GIS

• Presentations and discussion. End of SC2.

Specialist course 3: Terrestrial laser scanning

• Participant welcome and installation SC3

• Introduction to terrestrial laser scanning

• Demonstration of the terrestrial laser scanner, field preparation, point cloud registration, data registration

• Field work, introduction to point cloud data filtering and data management

• Field work, data processing, introduction to data deliverables

• Field work, data processing, publishing data (point clouds, deliverables)

• Presentations and discussions. End of SC3. End of summer school.
H. Selected Bibliography

General readings


GIS


Photogrammetry and image-based 3D modelling


Terrestrial laser scanning


Only scholarship holders are accepted to this workshop. Partial scholarships cover the majority of the tuition fees, except for participants’ contribution. For details, contact us at info@heritagemanagement.org.

- **A. G. Leventis Foundation scholarships** will be available for heritage managers working on (broadly defined) Greek cultural heritage (excluding airfare/travel and hotel expenses).

- **Benefactors’ scholarships of the Heritage Management Organization** for participation will be available for qualified candidates (excluding airfare/travel and hotel expenses).

To apply for this workshop please:

1. Fill in and submit the [Executive Leadership Program in Heritage Management Application Form](mailto:info@heritagemanagement.org).

2. After receiving confirmation of receipt of your application, complete the application process by submitting your CV, a personal statement (describing your current project that will benefit from this training) and a reference letter (which may come in separately by your referee at their earliest convenience). All your application documents may be submitted by email to info@heritagemanagement.org. Personal statements should not exceed 750 words in total.

3. A reasonable proficiency in spoken and written English is required to attend the course.

4. Shortlisted applicants will be asked to participate in a personal (oral) interview.

After approval of their application file, participants will receive an official letter outlining in detail the conditions of participation. [Heritage Management Organization Membership](mailto:info@heritagemanagement.org) comes with participation in any our Organization’s Executive Leadership in Heritage Management Workshops.

*Spaces for this workshop are limited, so please apply early.*

*Deadline for Applications: 1 April 2022*

For questions regarding the application process and the administrative aspects of the course, contact us at info@heritagemanagement.org.