

Training Excavation SS2011

as part of the „TOPOI-Summerschool 2011“,
a subproject of the „Ostia Antica- Foro di Porta Marina“ excavations
from **18. – 22.07.11** (introduction week in Berlin) and **29.08. – 23.09.11** (excavation in Ostia Antica)

The project is organized by the Winckelmann-Institut of the Humboldt University in Berlin and the Excellence Cluster TOPOI – Projekt A-III-6 (<http://www.topoi.org/group/a-iii-6/>).
The responsible excavation director will be PD Dr. A. Gering (HU Berlin).
Head of the subproject and contact: Undine Lieberwirth M.A. (EXC TOPOI) <undine.lieberwirth@fu-berlin.de>

Subject of the Subproject:

Researching Archaeological and Digital Documentation Methods for In-depth 3D-GIS-Analyses – A Comparison of the Methodology and Data Material of Scientific and Archaeological Documentation

Keywords: digital documentation methods, CAD/Total Station, 3D Laserscanner, databases, sediment analyses, soil micro morphology

a. Organisation and Financing

The „Topoi Summer School 2011“ excavation is part of the Exzellenzcluster 264 TOPOI's A-III-6 project on „Methodological Research“ and cooperates with the Winckelmann-Institut of the Humboldt University in Berlin. The project will research a large area consisting of a central temple near the western gateway of Ostia ('Foro di Porta Marina') and is directed by PD Dr. Axel Gering.

b. A Brief Introduction into the Documentation Methodology

The precision and value of models is always depending on the quality of the collected data. The collection of data during archaeological excavation (*on-site*) is therefore equally important to *post-excavation* analyses.

The aim of the TOPOI project is to create a virtual 3D-GIS model of the uncovered, and thus disturbed, structures. This model shall not only contain all archaeological information, but will also include data from relevant interdisciplinary fields such as geophysics, remote

sensing, pedology and palaeobiology. In order to create this model, previously tested methods will be used and/ or optimized (Neubauer & Doneus 2008, Lieberwirth 2011).

The ideal method, however, can only be determined on site and is defined by the site's specific conditions since the find spectrum at archaeological excavations cannot be exactly predicted. Thus, the challenge is to maintain a flexible system. In consideration of effective data acquisition and storage possibilities, the method follows an objective data documentation system.

What will be documented?

- Archaeological finds
- Architecture and stratigraphy (top and bottom surface)
- Chemical, physical and palaeobiological parameters

How will the data be documented?

- Use of the Harris-Matrix-Systems (single-context-recording)

The data will only be documented digitally, photogrammetrically and quantitatively. A 3D-Laserscanner will achieve a precise and efficient measurement of the surface and a Total Station will be used in order to gain singular measurements. The vector information will then be processed in an *on-the-fly* CAD-based software with an integrated database. As a result, the software can create a 3D-CAD-based site plan with all relevant information included.

Why document exclusively digitally?

On the one hand, the methodology considers post-excavation analysis methods, and on the other hand it takes present and future technical developments in terms of data documentation, analyses and long-term file storage into account. The emphasis, however, lies on the latter and is focused on an efficient and coherent workflow.

c. Research and Development

The TOPOI research group A-III-6 is interested in fundamental methodological research in archaeology and aims to fuse different methodological approaches. The final model is therefore based on archaeological, geophysical and remote sensing data, as well as quantified information on soil structures. The data will not only be analyzed statistically in the final model, but it will also be verified and compared during the excavation process. Recent developments have led to the testing of a prototype of a new measurement method based on a photogrammetrically collected data set. The results will be directly compared with the measurement data of the 3D-laserscanner on site and can be further processed in an open source software sponsored by TOPOI.

d. Student Participants

The „TOPOI Summerschool 2011 – Ostia Antica“ sub-project is primarily offered to Topoi members and free positions are open to students from the Berlin universities of all archaeological disciplines. The maximum capacity is 9 participants + 1 lecturer.

e. Previous Experience/ Post-processing

During an obligatory introduction week (time: **18. – 22.07.11**, location: FU-TOPOI-House, GIS-Labor, Hittorfstr. 18, 14195 Berlin) all participants will be guided through the used hard- and software. Topoi-members and students with previous experience in spatial analyses or measurements are primarily invited. IN the course of a block event the excavation results will be digitally processed in the winter semester 2011/12 (most likely in February 2012). Furthermore, on the basis of the 3D-CAD site plan, a voxel-based 3D GIS model will be created in order to develop statistical 3D spatial analyses.

f. Co-operations

- a) Geophysics (Dipl.-Geophys. Burkart Ullrich, TOPOI and estern atlas©)
- b) Remote Sensing - Photogrammetry (PD. Dr. Hans-Peter Thamm, TOPOI)
- c) Pedology – Physical Geography (Dr. Philipp Hoelzmann, TOPOI)
- d) Photogrammetry (Bernhard Fritsch M.A., TOPOI)

g. Calendar

Date	Description	Participants
CW 29	Introduction Week	Participants/Students Team1 and Team2
CW 35	Arrival Team1, geophysics, photogrammetry (octocopter), measurement and preparation of the two excavation trenches	Team1, B. Ullrich, H.-P. Thamm
CW 36-38	Arrival Team2, excavation work, comparison of methods: 3D PC-generation (laserscanner versus photogrammetry)	Team1 and Team2, B. Fritsch
WE 10./11.09.11	Visit to Pompeii/Herculaneum	Voluntary participation
WE 17./18.09.11	3D Laserscanner Introduction	Department of Antiquities of Jordan + voluntary participation

A map of Italy with the regions of Lazio and Campania highlighted in light green. The city of Rome is marked with a red square and labeled 'Rom', and the archaeological site of Ostia is marked with a green square and labeled 'Ostia'.

j. References

Internet Group Ostia (2009). URL: <http://www.ostia-antica.org/index.html> und <http://www.ostia-antica.org/research.htm> - Zugang 18.06.2011.

Lieberwirth, U. (2011) „*Documentation methods of archaeological records for further 3D GIS analysis*“ CAA 2011 – Proceedings of the Conference, in print

Neubauer, W. (2008) “*From Practice to Theory – Expanding the stratigraphic recording into real 3D*”. ViaVIAS 02, 31-3.

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