



LIVING DANUBE LIMES

How to make invisible - visible

Archeological Methodology and Presentation in the Digital era

SUMMER SCHOOL / VIMINACIUM 2021

HOW TO MAKE INVISIBLE - VISIBLE Archeological Methodology and Presentation in the Digital era

Today we live in digital era. Life and technology advanced into something children of 20th century dreamed as Science fiction. Research, excavation, and presentation changed completely in just few decades. Satellites, drones, sensors, high accuracy positioning... Today, for us – researchers of the Danube limes, this is everyday life. Challenges of the Digital era influenced that science, so conservative in the main methodological approach turns into hi tech futuristic research concept. And guess what.... It never lost that romance and rush it had centuries ago.

Today when we start excavations, we already have insight through geophysics what we are facing below. Aerial and drone imagery with GIS made mapping precise and more detailed. Photogrammetry and 3D scanners introduced archaeological documentation ready for virtual world and presentation of cultural heritage went beyond dreams.

Join us this summer in the new vision of protection and presentation of cultural heritage.



Dear friends and colleagues,

On the behalf of the Institute of Archaeology, Belgrade, it is our pleasure to welcome you to participate in the upcoming Archaeological summer school at Viminacium. The summer school is part of the project “Living Danube Limes”, which fosters a common bond in the Danube Region via heritage shared by all Danube countries. The project is funded by the Interreg Danube Transnational Programme.

The summer school is an exciting opportunity to learn about the use of different methods and new technologies in archaeology. The aim of the school is to get participants acquainted with full process of archaeological excavation, from prospection of the terrain, to different methods of documentation and processing finds. One of the main learning outcome will be introduction to multidisciplinary research methods in archaeological practice, shown on the example of Viminacium.

First segment of the summer school will be, due to the COVID-19 pandemic situation, online Zoom video conference. Number of participants in virtual summer school is limited to 80. First Summer school online segment will be held 14-18 June 2021.

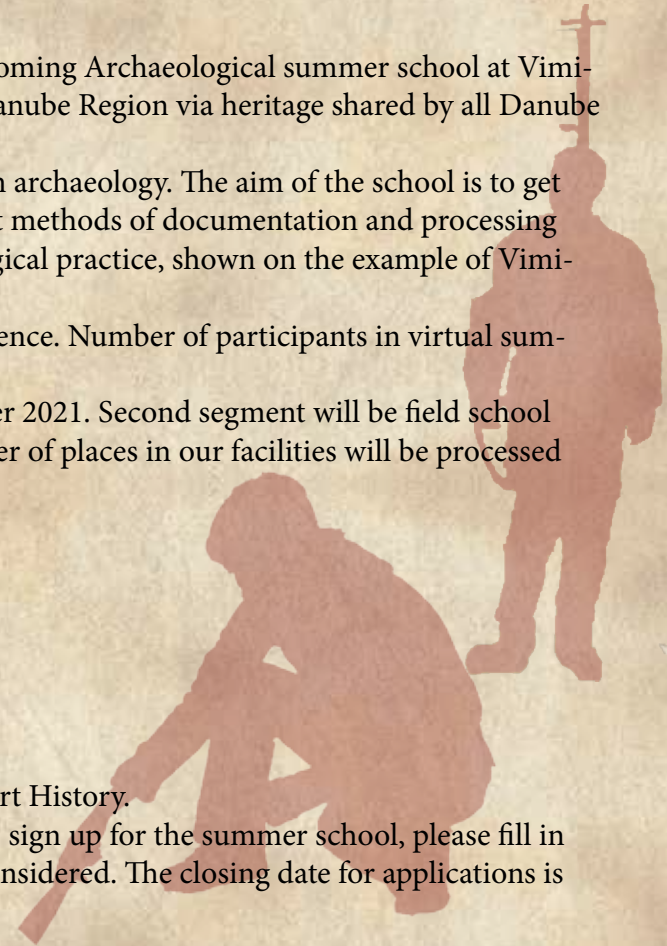
Second segment of the Summer school will be held at Viminacium Research and Visitors Center during September 2021. Second segment will be field school with workshops and field surveys with expert archaeological teams. Selection of participants due to limited number of places in our facilities will be processed out of participants of the Online Summer School in June.

The participants will learn about:

- Geophysical prospection of the terrain (Ground Penetrating Radar, Geomagnetic method)
- GIS and Aerial imagery
- Use of photogrammetry for documentation during and after excavations
- Processing of Roman pottery (analysis, methods of documentation, reconstruction and conservation)
- Anthropological methods of processing humane osteological material
- Presentation of Cultural Heritage and Virtual world of Archaeology

Preferred applicants are undergraduate students whose main interests are cultural heritage/Roman archaeology/Art History.

Participation is free of charge, but please keep in mind that the capacity is limited so please register in advance. To sign up for the summer school, please fill in the attached registration form and e-mail it to nemanjamrdjic@gmail.com. Only applications in English will be considered. The closing date for applications is the 12th of June 2021.



PHOTOGRAMMETRY

USE OF PHOTOGRAMMETRY FOR DOCUMENTATION

1. Use of photogrammetry for documentation during excavations /
 - large scale imaging (entire sites)
 - medium scale imaging (archaeological complexes)
 - small scale imaging (individual buildings)
 - micro imaging (features and details)
2. Use of photogrammetry for 3D, CAD, creation of plans, cross sections, profiles
3. Use of photogrammetry in Photo Studio for documentation of artefacts



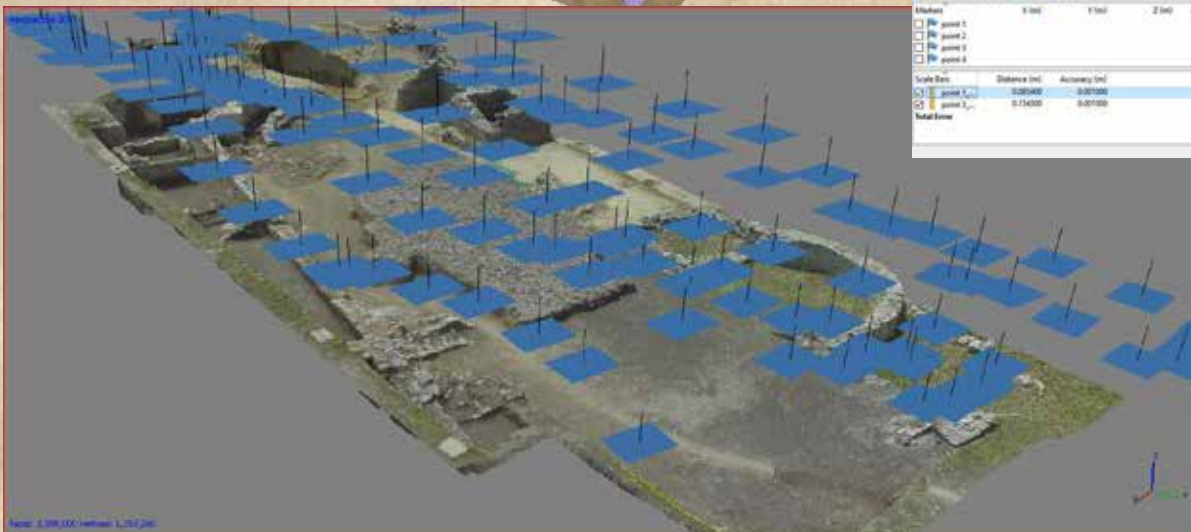
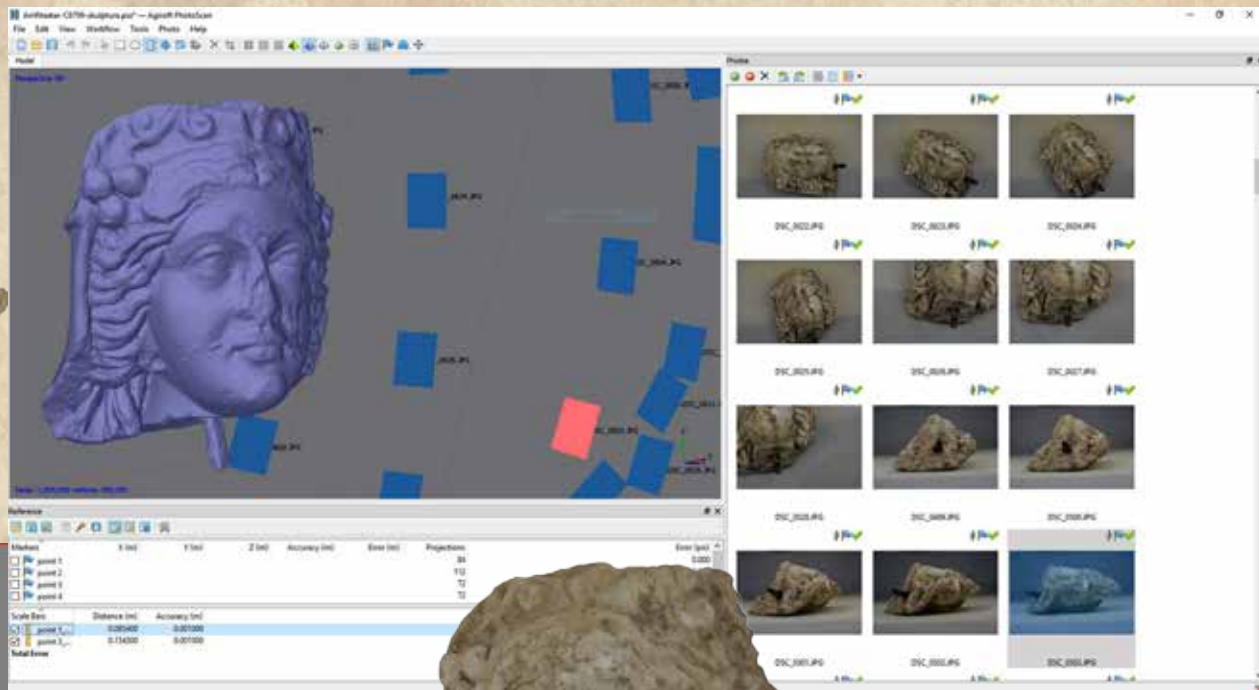
DEMONSTRATION TEAM

- 1 international expert
- 1 Researcher from Viminacium Scientific team
- 1 technician from Center for New Technologies

All equipment, software and hardware, junior and senior personnel available in Viminacium Research center

Demonstration possible at:

- Viminacium legionary fortress / large scale 20 ha area
- Viminacium legionary fortress principia / medium scale 1 ha area
- Viminacium legionary fortress - gate or barracks / small scale
- Viminacium archaeological museum / artefacts



GPR GROUND PENETRATING RADAR



1. Field Survey
2. Data processing
3. Archaeological interpretation

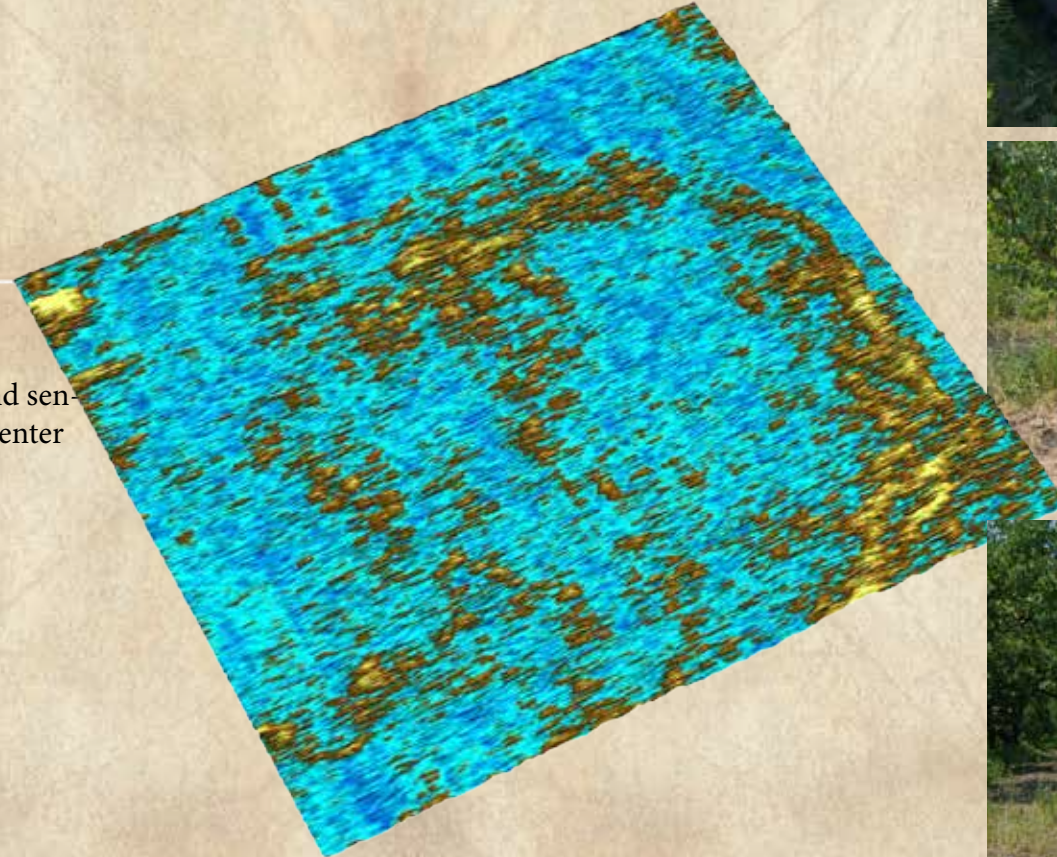
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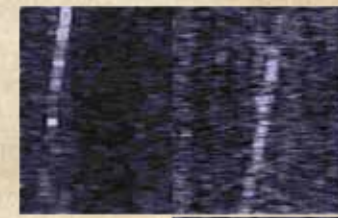
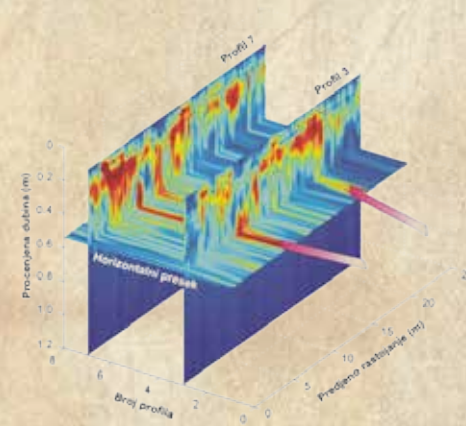
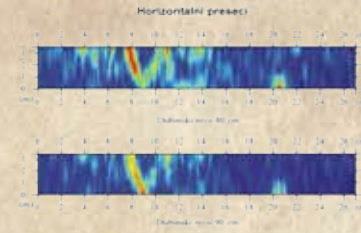
- Viminacium legionary fortress
- City of Viminacium
- Wide area of suburban zones or cemeteries



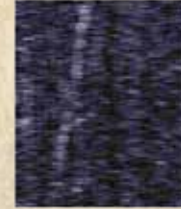
GROUND PENETRATING RADAR (GPR)

Electromagnetic methods include multiple methods of which in archaeology is the most common in use of GPR (Ground Penetrating Radar).

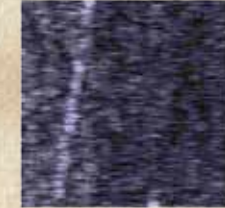
Georadar method is one of the most sophisticated research methods and is certainly the best known geophysical methods in archaeology, although not the most applied. It is based on broadcasting electromagnetic waves from the transmitting antenna part of the instrument which are reflected by specific boundaries or objects in the ground, and then register in the reception area of the antenna. The intensity of the amplitude, in fact the performance of detection, depends on the difference in the electromagnetic characteristics of the test object and the surrounding environment, primarily from the difference in dielectric permeability. The time the wave takes to get from the transmitter to an object or layer and be reflected to the receiver, indicates the depth at which the object is located. GPR is certainly a powerful tool when there are favorable conditions for its implementation. The advantages of this method of research are continuously collecting data at high speed, high density registered data, being non destroying method, the ability to generate 2D and 3D models, as well as the low level of interference when operating in urban conditions.



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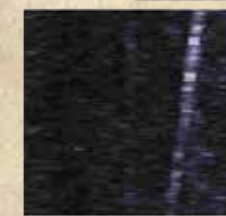
F



D



C



B



ROMAN POTTERY LABORATORY

1. Processing of finds
2. Pottery analyse methods
3. Methods of documentation
4. Reconstruction and Conservation

DEMONSTRATION TEAM

- Ivana Ožanić Roguljić (IAHR)
- Angelina Raičković Savić (IAB)

All equipment, software and hardware, junior and senior personnel available in Viminacium Research center

Demonstration possible at:

- Viminacium legionary fortress
- City of Viminacium
- Wide area of suburban zones or cemeteries

GIS AND AERIAL IMAGERY

1. Acquisition of data
2. Data processing
3. Archaeological interpretation

DEMONSTRATION TEAM

- 1 international expert
- 1 Researcher from Viminacium Scientific team (Nemanja Mrđić)
- 1 technician from Center for New Technologies

All equipment, software and hardware, junior and senior personnel available in Viminacium Research center

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3D MODELING

At Viminacium project, starting in 2014 is in use 3D modeling of mobile and immovable archaeological findings as a very good basis for the development of documentation. For 3D modeling is used method of data acquisition with high-resolution scanners and photogrammetric methods. Besides creating 3D models of terrain, archaeological unity and archaeological finding are modeled. Also, 3D typology of ancient pottery of Viminacium is being develop. 3D modeling results are incorporated into a database developed at Viminacium and thus provide a remarkable insight into the results of the archaeological research.



GEOMAGNETIC METHOD

1. Field Survey
2. Data processing
3. Archaeological interpretation

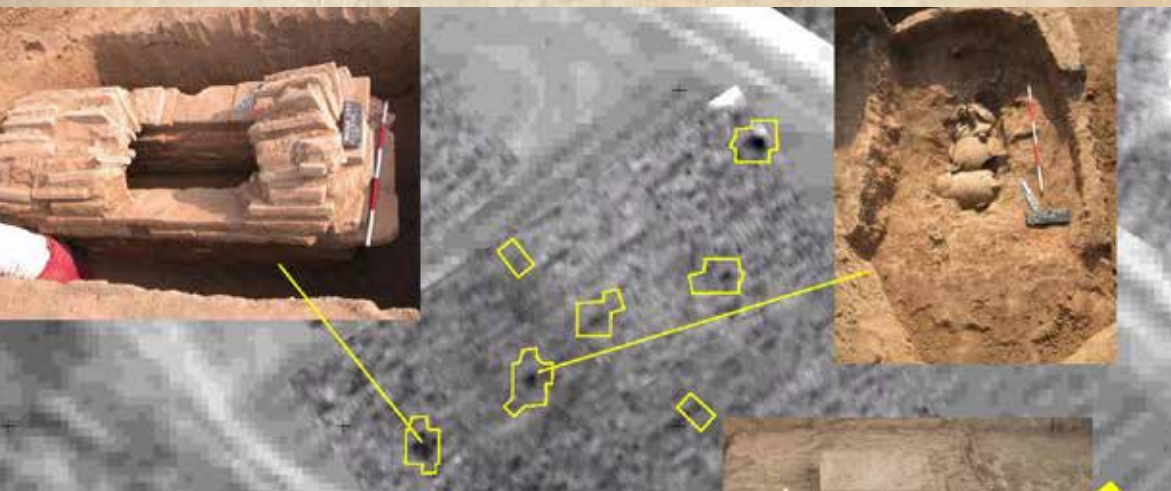
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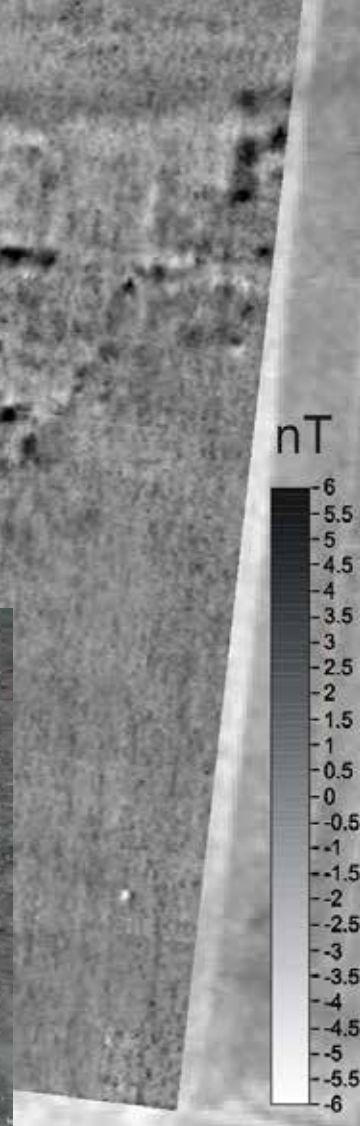
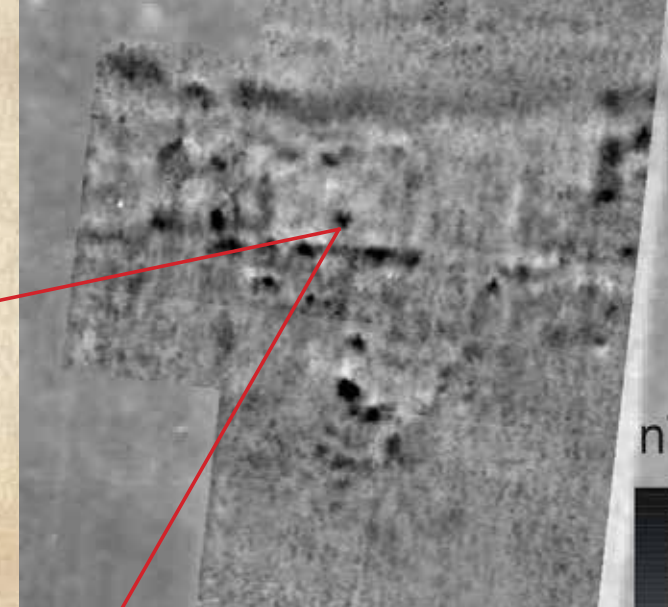
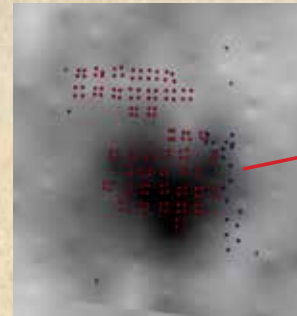
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GEOMAGNETIC METHOD

Geomagnetic prospecting is most frequently used method in archaeology, for several reasons. First of all, this method allows the capturing of large areas in a short time, and archaeological sites are characterized by a series of variations of magnetic field. Geomagnetic method is based on measuring the earth's magnetic field anomalies. There are various phenomena that lead to the appearance of the magnetic anomaly at archaeological sites, and the basic is the existence of thermoremanent magnetization. This phenomenon is due of the appearance that the material during heating magnetic molecules are oriented in the direction of the magnetic field, and thus part of the acquired magnetization retained. Since over the time the magnetic field changes its orientation, there is a distortion that could be very well registered by magnetometers.



ANTHROPOLOGICAL RESEARCH

1. Field Research
2. Anthropological methods
2. Data processing
3. Archaeological interpretation

DEMONSTRATION TEAM

Ilija Mikić (IAB) Viminacium Scientific team

All equipment, software and hardware, junior and senior personnel available in Viminacium Research center

Demonstration possible at:

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- City of Viminacium
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Iron Gate excursion



Golubac

Medieval fortress

with Roman road below





Diana - Roman Auxiliary fort



Archaeological Museum of the Iron Gates





PONS TRAIANI
KOSTOL / PONTES / TRANSDROBETA
ROMAN BRIDGE





PONS TRAIANI
KOSTOL / PONTES / TRANSDROBETA
ROMAN BRIDGE



Lederata excursion





I O M
VEXIL° LEG
VII° CL
V RA
C° LICIN° RVFIN°

Lederata - Roman Auxiliary fort



Viminacium Summer school

September 2021

Day 1

Afternoon: Arrival to the Viminacium Research Center

Day 2

Morning session: Visit to the Viminacium Archaeological Park and Mammoth Park

Afternoon Session:

Frontiers of the Roman Empire as UNESCO World Heritage Cluster

The Danube Limes as World Heritage Site

External lecturers

Nemanja Mrđić, IAB

Day 3

Morning Session: Presentations

Roman Pottery, Production, Typology, Conservation

Ivana Ožanić Roguljić, Institute of Archaeology Zagreb

Angelina Raičković Savić, Institute of Archaeology, Belgrade

Belgrade

Afternoon Session:

Pottery Laboratory workshop Roman Pottery, Production, Typology, Conservation

Ivana Ožanić Roguljić, Institute of Archaeology Zagreb

Angelina Raičković Savić, Institute of Archaeology, Belgrade

Belgrade

Anthropological Workshop – research on ancient human remains.

Ilija Mikić, Anthropologist, Institute of Archaeology, Belgrade

Belgrade

Day 4

Morning Session:

Geophysics – Magnetometer / Ground Penetrating Radar

Basic information / Presentations

Field workshop / Field survey

External lecturer: Einwögerer Christina promised to delegate her associate.

Center for New Technologies technical staff (1-2 Persons)

Afternoon Session:

Geophysics – Magnetometer / Ground Penetrating Radar

Data processing

External lecturer: Einwögerer Christina promised to delegate her associate.

Center for New Technologies technical staff (1-2 Persons)



Day 5

Morning field session:

GIS

Photogrammetry – 3D modeling of buildings and features in the field / Viminacium Legionary fortress and Amphitheatre.

Center for New Technologies technical staff (1-2 Persons)

Nemanja Mrđić, IAB

Raffaella Woller, DUK Any suggestion?

Afternoon Laboratory session

GIS

Photogrammetry – 3D modeling of pottery and small finds

Center for New Technologies technical staff (1-2 Persons)

Nemanja Mrđić, IAB

Raffaella Woller, DUK??? Any suggestion

Day 6

Iron Gate Excursion / Full Day, Meal on the go take away.

Nemanja Mrđić, IAB

Milica Marjanović, IAB

Golubac fortress, municipality ASP representative

- Golubac fortress
- Lepenski Vir prehistoric site
- Diana Auxiliary fortress
- Archaeological Museum of the Iron Gates
- Pontes, Trajan's bridge, and Roman Auxiliary fort
- Return to Viminacium.

Day 7

Excursion / Half Day, Meal on the go / take away.

Nemanja Mrđić, IAB

Milica Marjanović, IAB

Veliko Gradište municipality ASP representative

- Ram Turkish fortress and Roman road with inscription below it
- Lederata Roman Auxiliary fort
- Departure to Belgrade
- Arrival to Belgrade 16:00



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