

The discovery of the school of gladiators at Carnuntum, Austria

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Sophisticated techniques of archaeological survey, including airborne imaging spectroscopy, electromagnetic induction and ground-penetrating radar, are opening up new horizons in the non-invasive exploration of archaeological sites. One location where they have yielded spectacular results is Carnuntum in Austria, on the south bank of the Danube, capital of the key Roman province of Pannonia. Excavations in the late nineteenth and twentieth centuries revealed many of the major elements of this extensive complex, including the legionary fortress and the civilian town or municipium. Excavation, however, is no longer the only way of recovering and recording the details of these buried structures. In 2011, a combination of non-invasive survey methods in the area to the south of the civilian town, where little was visible on the surface, led to the dramatic discovery of remains interpreted as a gladiatorial school, complete with individual cells for the gladiators and a circular training arena. The combination of techniques has led to the recording and visualisation of the buried remains in astonishing detail, and the impact of the discovery is made all the greater by the stunning reconstruction images that the project has generated.

Keywords: Austria, Carnuntum, Roman Empire, gladiators, ludus, remote sensing, geophysics



Figure S1. Virtual reconstruction of the Catnuntum *ludus*, viewed from the south. © Michael Klein.



Figure S2. Virtual reconstruction, viewed from east to west. © Michael Klein.



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Figure S3. Virtual reconstruction of the Carnuntum *ludus*, viewed from above. © Michael Klein.