Reconstructing Temples in Central Italy and 4D modeling

A New Research Project in the Archaeological Department of ACASA, UvA

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Archaic temples may be regarded the most prestigious buildings in the urban landscape of ancient Italy, emerging within a network of centres of the then-known Mediterranean world. A problem in the study of the early temples in Central Italy lies in the fact that they were largely built from perishable materials and are only left to us in a fragmented state. Notwithstanding the fragmentary condition of the remains, these monuments are crucial sources of information on the constitution of religious, political and social identities. Innovative and dynamic reconstructions with the help of 3D and virtual reality simulations offer great possibilities in studying transformative processes. The usage of 3D reconstructions during the research into built environments offers new insights and a new approach for analyzing data. The many perspectives on the actual building itself, i.e. the spatial context, and the possibility of visualizing the architectural phases through time (the '4D' element), makes 3D modeling an innovative tool for the specialist. The path that leads to the final reconstruction of the building is documented and this documentation generates a vast amount of new data otherwise never encountered. 3D Reconstructing offers a virtual world where various kinds of experiments can be conducted by scientists from the Humanities. In addition, this technology contributes to present the new knowledge to a wider public in the form of websites, virtual and augmented reality worlds and applications. In 2012, Patricia Lulof changed her field of research partially to the area of Digital Humanities and the application of 3D modeling for the reconstruction of ancient architecture. The focus is mainly on Archaic temples in Central Italy and in some cases including their very long after life with its decorations, additions, renovations and reconstructions. Digital reconstructions will be used as a research tool, the usage of which necessitates scholars to test hypotheses in a much more precise and systematic way than with research based on descriptions or simple linear, primarily two-dimensional reconstructions. Apart from being a research tool, these 4D-models require new reflection of methodology and theory. And they provide new ways to serve a wider public, interested in our shared cultural past as a citizen, reader or tourist. The reconstructed monuments have become part of world heritage and deserve to be made accessible to people from all over the world. The basis of the research consists of material remains (ranging from archaeologically excavated foundations and numerous architectural terracotta's), drawings, unpublished texts and sources, and previous reconstructions, mostly in the form of linear drawings. In all cases, the result will be a set of digital reconstructions combined with written publications. The project uses a new Digital 3D Research Lab, launched in 2012, for which the Faculty of Humanities of the University of Amsterdam has granted substantial funding. *The Art of Reconstruction* was a pilot-project (2012-2013) that aimed at the

exploration of the usage of digital 3D-reconstructions to support research to historical and archaeological architectural settings. Another goal was to contribute to the development of a methodology for 3D modeling as a scientific research tool. As a case-study the temple of Caprifico (Latium) was chosen because it had already been thoroughly studied, published and reconstructed with traditional illustrations. The temple was situated 60 kilometers south of Rome and founded about 520 BC, stood only for a brief period and was destroyed shortly after 500 BC. The emphasis of the project was on the documentation of the process of modeling, and to store the meta-data generated from this process together with the original data-set, into an interoperable and easy accessible database. This to provide a transparent and *accessible* reconstruction as possible. The process of building the model generated new insights and results never foreseen. It also forced the researchers to reanalyze the original and traditional data-set from this new perspective. The research, results and 3D reconstruction have been presented and published at the *Digital Heritage Congress* at Marseille and the international conference *The Age of Tarquinius Superbus* in Rome, both in 2013. In December 2013, an embedded research project started entitles: *Archaeology of Architecture. Virtual 3D Reconstructions of Lost Monuments*, for the development of. an interoperative modeling program and publication format of 3D and 4D reconstructions of architecture and cityscapes. Finally, for the first half of 2015, an international research project has been granted at the Netherlands Institute for Advanced Study: *Biographies of Buildings. Virtual Futures for our Cultural Past*, focusing on a chronologically ordered set of case studies of ancient architecture in Central Italy, temples founded since the sixth century BC and afterwards re-built and extended during several centuries up until Republican times and the Early Middle Ages.

Essential Bibliography:

P.S. Lulof, Il tempio di Caprifico a confronto. L'immagine ritrovato. In A.Conti (Ed.), *La decorazione architettonica fittile tra Etruria e Lazio in età arcaica* (Atti delle Giornate di Studio, Sapienza, Università di Roma, 25 marzo e 25 ottobre 2010) = *Officina Etruscologia* 5, Rome 2011. 263-273

P.S. Lulof, "The Art of Reconstruction and the Image of Power", in C. Chiaramonte Treré, G. Bagnasco Gianni & F. Chiesa (eds.), *Interpretando l'antico. Scritti di archeologia offerti a Maria Bonghi Jovino* (Quaderni di ACME, 134), Milan 2012, 111-130.

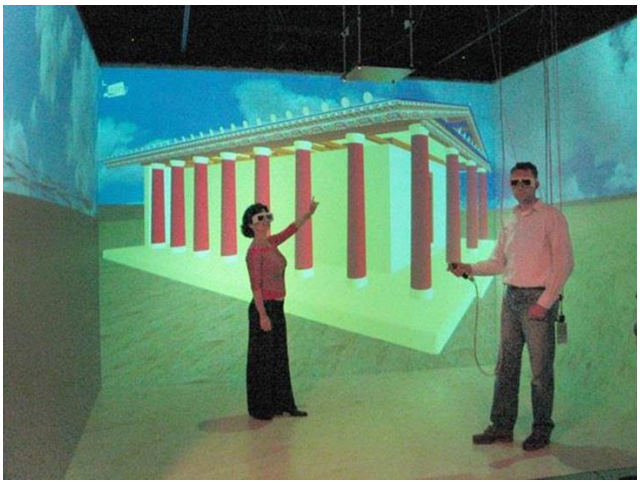
P.S. Lulof, "The Art of Reconstruction. Documenting the process of 3D modeling: some preliminary results", in *Digital Heritage* 2013 Marseille, 333-336 (with L. Opgenhaffen and M.H. Sepers).

L. Opgenhaffen, "The Art of Reconstruction 2.0: The scientific value of 3D simulation within (archaeological) research", in *TMA* 52, in preparation.

M. Ratto, "CSE as epistemic technologies: computer modeling and disciplinary difference in the humanities," Lang and Sharrock (eds) *Handbook of Research on Computational Science and Engineering: Theory and Practice*, IGI Global, 2011, 567-586.

Figures:

1. Virtual reconstruction of an Archaic temple in the CAVE of SARA, Amsterdam (2005)



2. Reconstruction in 3D of the temple of Caprifico, front (2013, L. Opgenhaffen & M. Sepers)

3. Reconstruction in 3D of the temple of Caprifico, apex with acroteria (2013, L. Opgenhaffen & M. Sepers)

4. Reconstruction in semi-3D of Temple II of Satricum (2014, P.S. Lulof & L. Opgenhaffen)

5. Reconstruction of a decorative roofsystem, Campanian type (2005, P.S. Lulof)