

*Paper prepared for the
8th Euroacademia International Conference
Europe Inside-Out: Europe and Europeanness Exposed to Plural
Observers*

*Lucca, Italy
28 – 30 September 2018*

*This paper is a draft
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Architectonic Design as Mediator for Archaeological Hypotheses

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Abstract (300 word):

Europe's cultural heritage and identity is characterized by its diversity on a common basis. Bridge-building between centuries underlines Europe's intercultural dialogue. The antic metropolis of Pergamon is one of Europe's early urban agglomerations following the classic foundations from a fortified acropolis to wide spread populated areas. Archaeologists' hypotheses at length concentrated on public buildings like palace, theatre, gymnasium, markets, altars and temples. Recent research unveils their urban context, axes, densities and sanctuaries.

These hypotheses contain various degrees of certainty and even scientifically justified controversial hypotheses. Irritatingly most visualizations equal simulations of film sets, pure phantasy.

We have developed a method for visualizing archaeological hypotheses that explicitly preserves the scientific content excluding any unintentional content that implicates anything except archaeological science.

It consists of two complementary parts: virtual modeling and virtual photography. Other than usual we do not consider the spatial model as the decisive core in mediating archaeology but as an integral part of the visual mediation. We consider its counter part, the virtual photography, as equally important. Contrasting the geometric abstraction of the model, strictly based on the verbal hypotheses, our way of depicting the scenery uses traditional methods of realistic architectural photography. Leaving out any staffage, the emphasis lies on the timeless qualities of European architecture as shared patrimony, yet contributing to architecture as European Heritage.

The presentation aims to demonstrate and illustrate this method by several projects developed by the authors in cooperation with archaeological research institutions like Cologne Cathedral and its Predecessors (by order of and exhibited in Cologne Cathedral), The Metropolis of Pergamon (within the German Research Fund Excellence Cluster TOPOI, actually exhibited in Leipzig as part of Sharing Heritage, the European Cultural Heritage Year 2018), The Palatine Palaces (by order of the German Archaeological Institute, both latter exhibited in the Pergamon Museum Berlin).

Contribution:

Introduction

The Visualisation of Uncertainty is a method to explicitly visualize the uncertainty in archaeological knowledge. Its aim is to support archaeological research and communication.

Uncertain knowledge in archaeology describes the way archaeologists estimate their hypotheses. Knowledge ranges from certain facts – i.e. remains, ruins, stones – over their interpretation – i.e. what the remains might have served for – up to uncertain but scientifically based hypotheses – i.e. what might have been around the remains: walls over foundations, rooms built from walls, roofs covering rooms etc. As long as hypotheses are scientifically justified they belong to archaeologists' knowledge, yet uncertain knowledge. Building architectural hypotheses demands a large amount of spatial imagination. We will come back to this later.

Visualisation in our sense is a creative act. It contains physical simulations like geometric projection and light dispersion but mainly concerns the creation of artefacts. And since our visualisations concern space, they, too, demand a highly developed competence in spatial imagination.

The starting point was to implement methods established in architecture into archaeology. The reason for this approach is that in archaeology scale and perspective drawings are well developed and established while the use of natively spatial modeling is far further developed in architecture.

What allows for a contribution of architectural methods in archaeology is the way both disciplines handle abstraction – both not only in their reasoning, but also in the way they visualize. Archaeology uses abstraction in drawings to emphasize their hypothetical character – uncertain knowledge. Architecture uses abstraction to suggest design ideas – intended uncertainty. An architectonic design sketch can be read as an archaeological hypothesis.

Both applications of abstraction require a common understanding of abstraction not as a lack of information, but as a focus on the essential. As some aspects are left undefined, abstraction does not only serve as a selection but – even more important – as an induction of associations. The main benefit of abstract images in this context is therefore their ability to provoke individual imaginations. These imagination lead to new scientific hypotheses at archaeologists – and to a general understanding of science at hopefully everybody else.

So the aim of the Visualisation of Uncertainty is to transfer methods of architectural visualisation – based on the abstraction in design processes – on the visualisation of architectonic hypotheses.

State of the art

The focus on architecture neglects aspects of life that in the real world overlap the pure visual built structure. These are the use of space, sensorial fields like sound and smell, but also erosion and traces of usage. Any of these might be in the focus of hypotheses, but in most cases their degree of uncertainty is much higher than of built architecture.

As these life aspects are considered responsible for vividness and immersion, they became the movie industry's expertise. We call it "hollywood realism" to emphasize that this way of pretending realism implies that phantasy is valued far higher than scientific foundations. Its method is simply to raise everything to a realistic degree without regard to its degree of certainty. Despite this large gap between phantasy visualisation and scientific founding, many archaeological visualisations try – and mostly in vain – to imitate this method.

The re-establishment of the abstraction of archaeological drawings in the third dimension bears the chance to communicate specifically what we know, what we think might be probable, what we don't know and – most important – that not being able to ever find out about something is an essential part of science.

This is commonly pursued with diagrams. They clearly point out the ruins, their extrapolation and hypothetical completion in a clear, non-misunderstandable way. Still, diagrams do not provide any spatial impression. They do not suggest any spatial interpretation that would induce new scientific hypotheses.

So there are two facing positions: the immersive phantastic utopia with little scientific foundation on the one side, and on the other side the scientific abstract diagram that reflects the scientific knowledge without any spatial impact.

Our approach is to reduce the argument of a visualisation on architecture in order to focus on the highest probability and to make its uncertainty appear as immersive as possible. It is a balancing act, and it does not answer all needs, but it involves a high potential for the visual communication of scientific hypotheses.

Method

In short, the Visualisation of Uncertainty combines two architectural disciplines: design modelling and architectural photography. Design modelling handles abstract geometry to suggest design ideas and the selective view of an architectural photography for a sophisticated spatial impression.

The advantages of this way to visualize are that it

- minimizes the exceeding of the archaeologists' hypotheses
- yet provides a spatial vision
- allows an immersion into an abstract world
- evokes individual completion for an architectural vision and
- therefore induces ongoing scientific reflection

Abstraction in this context provides

- reliability of the visualisation and
- the potential of scientific development based on the visualisation

But just as combining two established methods seems very simple, the creative act of visualisation relies on architectural design which is – as you know – an infinite challenge. To start with, we developed a set of conventions that build the framework. Within this framework the parameters of the visualisation aim to optimize the effect of perception towards an intuitive understanding of the original hypothesis.

The conventions concern both, modelling and photography:

Modelling uncertainty is mainly achieved by geometric abstraction. Additive details are minimized to a degree that is necessary to get a complete spatial vision, not more.

Geometric abstraction is extended to a type level. E.g. areas that are composed with variations of the same type of buildings become legible as a city texture.

There are some more considerations regarding transparency, graphical elements and colour. In total, the set of modelling conventions is oriented towards its projection, just like a film set.

Photography – as the second essential part – provides geometric reliability, for which mainly the eye level and the orientation of the projection plane are responsible.

Here again the full set of conventions contains some more aspects and details.

But despite all conventions – as in any creative activity – the overall design competence decides if a result will be successful or not. The application of rules – or conventions – helps to start off, but will never guarantee high level results. In short, the Visualisation of Uncertainty is the design of abstraction. The ingredients seem simple, their blending makes the difference.

We consider this approach to have the potential to establish a visual language for scientific archaeological hypotheses.

Short biographies (200 words):

Dominik Lengyel, born 1972, studied Architecture at the Universities of Stuttgart, Paris-Tolbiac and ETH Zürich. After working as architect at Prof. O. M. Ungers 1997–1998, he founded an office for architectural visualisation with Catherine Toulouse. In 2002 he began teaching as first substitute and then regular professor at the University of Applied Sciences in Cologne. Since 2006 he holds the Chair for Architectural Representation as full professor at the Brandenburg Technical University of Cottbus. His major research area is the visualisation of archaeological hypotheses. Since 2007 he is associated and since 2012 regular member of the research program Exzellenzcluster TOPOI. Since 2018 he is a member of the European Academy of Sciences and Arts in Salzburg.

Catherine Toulouse, born 1973, studied Architecture at the Universities of Stuttgart, Paris-Tolbiac and ETH Zürich. After working as architect at Prof. O. M. Ungers 1997–1998, she founded an office for architectural visualisation with Dominik Lengyel. Since 2006 she works as assistant professor at the Brandenburg Technical University of Cottbus as Chairholder for Architectural Representation. Her major research area is the visualisation of archaeological hypotheses. Since 2007 she is associated and since 2012 member of the research program Exzellenzcluster TOPOI.