

Digital visualisation: Ancient Rome, and beyond

MATTHEW NICHOLLS



Figure 1
An overview of Matthew Nicholls' model of ancient Rome, from the south.

Dr Matthew Nicholls is Associate Professor in Classics at the University of Reading. He has been awarded a British Academy Rising Star Engagement Award (BARSEA) for his project on 'Digital Visualisation in the Humanities'. On 9 October 2015, he attended the British Academy Early Career Research Showcase event to give a presentation of his own digital visualisation of Ancient Rome, and he spoke to the *British Academy Review* about his work.

What is your Virtual Rome model, and what is it trying to do?

I have recreated the city of Rome as it appeared in the early 4th century AD. It is a 3D architectural model of the city (Figure 1). It is a fully explorable digital artefact,

so you can move cameras round it, fly through it, create renders of individual buildings or of the entire city from any angle, any sun position, any altitude, all the way from a 'God's eye view' down to street level. It is aiming to be a comprehensive urban model of the entire city. It grew out of individual buildings that I was making to illustrate my research. It became a teaching tool that my university supported, very generously. It is becoming, again, a research project as I start to investigate sight lines and illumination within the city, and the way the topography and the monuments interact with one another – research questions that are made possible by having made a model of the entire city.

The BARSEA project I am currently running with the British Academy's funding is to talk about digital visualisation in humanities disciplines more broadly,

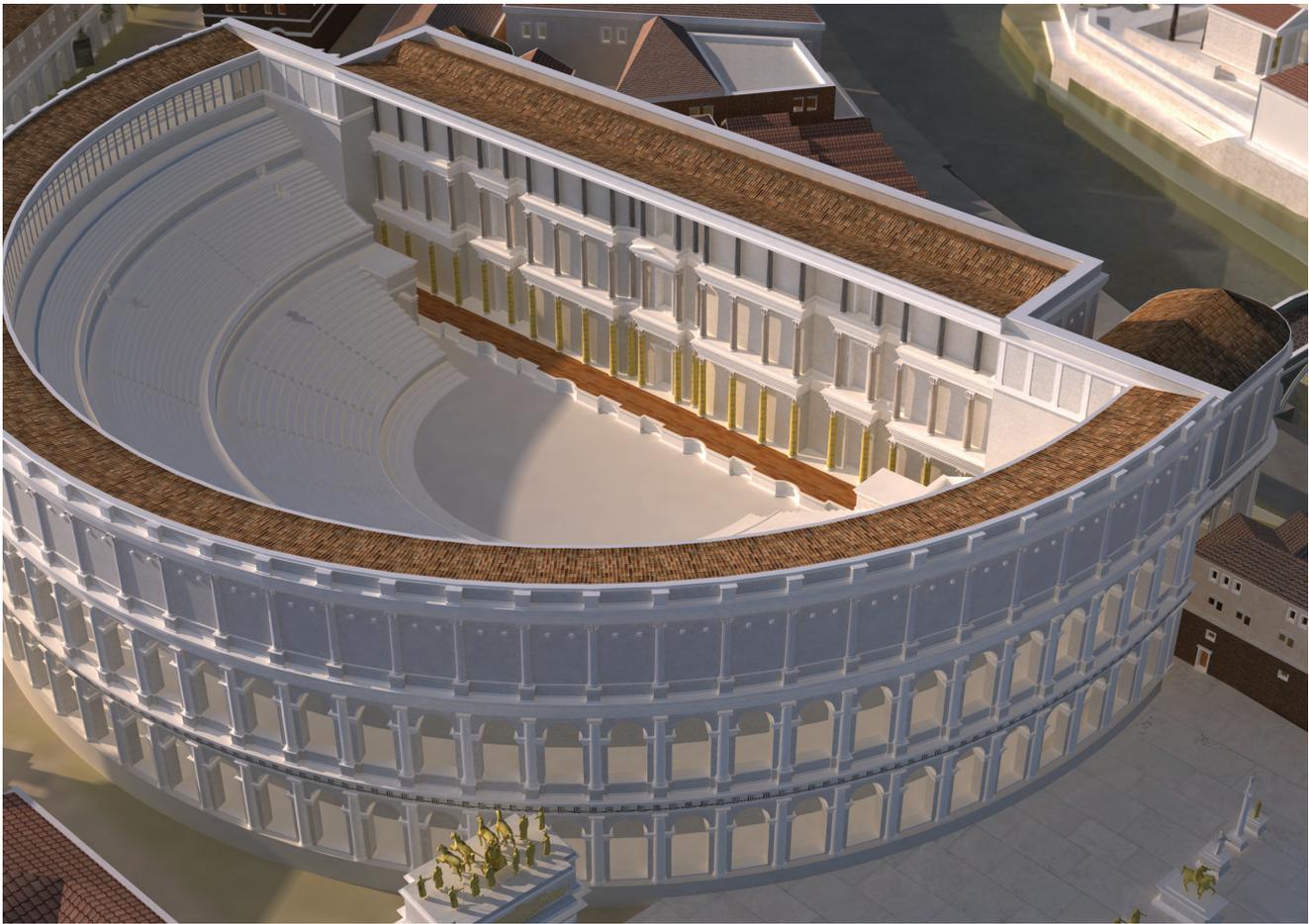


Figure 2
The Theatre of Marcellus in Rome, in which the Saecular Games took place, showing the sunlight at 9am on a June morning.

and to try to link up what I am doing with what I suspect a lot of people at my career stage are doing in their own disciplines around the place.

What does this approach bring that is transformative?

Having the whole city as a navigable entity, from way up in the air down to ground level, certainly taught me a lot about the city of Rome, and it is helping my students learn more about the city of Rome too. I really like how this sort of work brings research and teaching together. The model is created as a teaching tool, and I have student assistants working on it. But it is also a research tool which enables you to do things that you could not do otherwise.

At the moment I am working on a study where we have the timings for a certain set of theatrical games in Augustan Rome. We can set up the model for those times and dates, and look at what the sun is doing in the theatres. It turns out that the sun is on the stage during the hour of the Saecular Games that Augustus set up (Figure 2). That was a nice finding.

I am also working with a colleague at Durham on an article about sight lines. How do buildings present themselves from different points in the city? If you are standing close up, can you tell it is a bath house? If you move further away, can you still tell it is a bath house?

It is very difficult to think of how you would do that without this kind of immersive digital model.

One of the fun things is that just building the model suggests these questions. I didn't necessarily have these ideas in mind specifically when I set out. But, having created this, we can now see the opportunities, and there is a lot of interesting work to be done.

To study the history of a place, traditionally one has had to visit it oneself to witness the local conditions. Does digital modelling mean that one no longer has to visit what is left of a site, but can now experience it as it was through the 3D reconstruction?

I hope not. I think visiting these sites is essential. I take students and others to Rome pretty much annually. I have always regarded going to see these places as an essential part, and frankly a fun part, of the discipline that we do. So, no, it doesn't stop people doing that.

I think this offers a supplement to that. When we visit a site, what to an expert eye might be very revealing, might to the first-year undergraduate look like a disappointing heap of stones. Something that can help the student move on from that initial impression to an understanding how those pieces once fitted together is a helpful supplement to that experience of visiting in person. It is not a replacement.



Figure 3
Digital visualisation of the Colosseum and the Arch of Constantine in Rome.

And I would never make the claim that what I have created is so accurate and so reliable that it just erases the need to consider for yourself the faults, variances or doubts in what I have created. Many different interpretations are possible; mine is just one of them. So you should go and see and think for yourself.

How many conjectures have you had to make in constructing your 3D model?

Millions, literally millions. There are about 4 or 5 billion separate polygons – different faces – in the model, and each of those is the result of a series of mouse clicks, and each mouse click is an educated guess.

Any city-wide model is going to have buildings we know a lot about, like the Colosseum (Figure 3), which we can reconstruct pretty accurately because half of it is still there, ancient writers talked about it, it is on coins, etc. – a very well attested building.

There will also be miles and miles of back streets full of *insula* blocks, people's flats, warehouses, restaurants, little bath houses and mini piazzas, which we know sometimes very little about, sometimes literally nothing about. You can't make a city model without including all of that, because that is the texture and in-fill and background and bones of the city. But to put it in, you have to make guesses – I hope educated guesses, based on reasonable comparanda and wide reading, looking at all

the available evidence and drawing the dots – but there is a lot of conjecture.

In digital modelling, unlike perhaps in some other forms of reconstruction, you can differentially colour it, or you can turn bits of it on and off. You can maybe turn off all the bits you are uncertain about; or perhaps turn on all the bits that are based on one kind of evidence, for example Septimius Severus' marble map of Ancient Rome which accounts for maybe 10-15 per cent of what is in my model. By highlighting bits or making them disappear, you can express doubt and variance to an extent.

And pictures are not enough by themselves, because they might make a false claim: they might try to present themselves as authentic and completely reliable, when they are just an act of interpretation. So having alongside them some sort of written commentary for scholarly readers – saying 'This stuff I am pretty sure about. This stuff I am less sure about' – is an essential aid to the usefulness of such a creation. The ways in which reconstructors can create and present these differential views, or the research data and metadata underlying a digital reconstruction, is something that we're still working out, and that I am sure will continue to develop.

Are there insights for other Roman sites?

In terms of how the city works, how the streetscape works,

yes. One of the things that I am finding increasingly interesting is how the monuments of Rome exist in a sort of dialogue with the urban maze around them, and how they either do or do not address the mazy, windy organic streets. There are many cities in the ancient world that are like that, and there are others that are on a grid plan, where the monuments might be more rationally articulated within the urban framework. So, yes, I think there is work to be done in comparing Rome to other places, in terms of this ability to put yourself at Roman's eye view and walk around within the city-scape.

Are there public engagement benefits?

Yes. I am doing a lot of public-facing work with it, a great deal – schools talks and museum talks all the time. I have licensed it a few times now for television documentaries and there have been some interesting results. I am licensing it at the moment for a computer game studio to make a walkaround version of Rome which will be the basis for a game. I am making it into a MOOC, a 'massive open online course', at my university. It has been the basis of popular publications in magazines and books already, and I am writing a book that will be aimed at sixth-formers, undergraduates and the general public. So it has a lot of public-facing application.

I do think that digital visualisation is a very convenient way of engaging the public with ancient history, because people are used to documentaries that do this sort of thing, and movies. Our students now are digital natives and they expect 3D graphics to be part of their experience of the ancient world.

Do academics yet expect 3D graphics to be part of their work?

It is becoming increasingly current. There are a number of research projects, and have actually been for some years, that are using 3D visualisation either as part of their public engagement work or more profoundly as part of their research agenda. As part of my BARSEA work, I am going round speaking to these people. I think what is new is that, 10-15 years ago, this was the preserve of specialists: academics would engage a CAD (computer-assisted design) person to do the 3D visualisation for them. That is still the pattern generally, but I have made my model of Rome myself.

Through my BARSEA award I have had the chance to

make contact with others working on similar or complementary projects. For example, I've been in contact with: a team in Berlin who are working on a reconstruction of the Roman forum; a project making reconstructions of archaeological sites in Iran that sustains itself by selling educational DVDs; studios who work on reconstruction for commercial clients like broadcasters and publishers; and other academic projects in the UK and overseas. These teams have fairly disparate aims and workflows, and are pursuing different goals across different disciplines: some are inside the academic world, some are in the commercial world. But it was interesting to discover the threads of connection between them. Questions I have faced as a single researcher working in particular period and academic discipline have in different forms been faced by all these projects – questions like the use of colour and texture, dealing with hardware and software limitations, and resolving the tensions between, say, attractive photorealism and documentable accuracy. The solutions arrived at from different directions by these projects have been very interesting and informative.

I think the software is becoming easy enough, and the functionality of the hardware and software versatile and sophisticated enough that it will increasingly be the case that individual researchers or small teams of researchers will be able to acquire within themselves the skills needed to do at least simple visualisation. This is part of the rationale behind my BARSEA project. I think more people should be doing this stuff. It is not that hard, so I think it will become more common. To that end, I have also been able to use my BARSEA award to host a workshop introducing the basics of digital modelling software to humanities researchers, from graduate students to established academics. Those attending were from a wide variety of disciplinary and institutional backgrounds and will, I hope, take back to their own work a sense of the research, outreach and teaching possibilities afforded by digital modelling.

This interview was recorded as part of the British Academy's contribution to Academic Book Week 2015.



For an audio recording of it, including parts not printed here, go to www.britishacademy.ac.uk/digitalvisualisation/