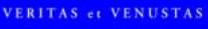




**POLITECNICO  
DI MILANO**

### Rassegna stampa Roma Reborn

Testata	Tipologia	Data	Titolo articolo
	online	03 ottobre 2007	Rome Reborn: an ancient virtual city
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	online	14 giugno 2007	Roma imperial en tres dimensiones
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	online	13 giugno 2007	La Roma imperial regresa a la vida en una recreación virtual
	online	12 giugno 2007	Resucitan a la Roma antigua
	online	12 giugno 2007	Ancient Rome rebuilt in virtual model
	online	12 giugno 2007	Rome reborn in virtual glory
	online	11 giugno 2007	Rome Reborn
	online	11 giugno 2007	Ancient Rome comes back to life in virtual model
	online	11 giugno 2007	La Roma clásica renace en una gran maqueta virtual
	online	11 giugno 2007	Ancient Rome Rebuilt Digitally
	online	11 giugno 2007	Ancient Rome brought back to life

	online	11 giugno 2007	International Team Rebuilds Ancient Rome Digitally
	online	11 giugno 2007	Ancient Rome reborn in digital simulation
	online	11 giugno 2007	Interactive model of ancient Rome to go online today
	online	11 giugno 2007	Rome Reborn 1.0
	online	11 giugno 2007	Ancient Rome comes back to life in virtual model
	online	11 giugno 2007	Ancient Rome comes back to life in virtual model
<b>Radio e TV</b>			
	tv	16 giugno 2007	TG 21,30 - SBT brasil

	Timesonline	<b>TIMESONLINE</b>
online	03 ottobre 2007	

## Rome Reborn: an ancient virtual city

*A huge digital representation of Rome in AD320 may help scholars and enthusiasts get into the mindset of senators and slaves*

In the fourth century AD, Rome was a sprawling megacity feeling secure about its prominence as the undisputed capital of the world. The recently constructed Aurelian Walls enclosed the city in a fortified embrace, strong enough to fend off any pesky barbarian invaders, the city fathers assured. Inside the walls was a city spanning 35 square kilometres, home to more than a million people.

Of course, repeated attacks that began less than a century later would eventually topple the city. Waves of thugs would pillage and loot, leaving the city in a schizophrenic state, much of it still evident today. A number of scattered ruins stand incongruously beside modern apartment buildings and shops. And, not far from my apartment, the massive Aurelian Wall still looms, a reminder of Rome's ancient splendour, and its vulnerability.



Academics and researchers have been studying Rome for centuries, trying to piece together what it must have been like inside those ancient walls. A city of that size would require an unprecedented level of urban planning to move people, livestock and traffic around in an orderly fashion. It would also require some level of policing, not to mention local ordinances to designate the rules of commerce, taxation and sanitation.

A good deal about life in ancient Rome has been pieced together, but countless gaps remain.

A group of international researchers hope to fill in some of those voids with a recently unveiled full-sized, three-dimensional map of Rome. The map is a magnificently precise rendering of Rome, circa AD320. It contains details of the 7,000 buildings – in many cases, down to the shades of the tiles – contained within the walls of ancient Rome at the time, allowing the user to fly over much of the ancient city, gliding through the chariot lanes of the Circus Maximus and climb the steps of an intact Colosseum.

The virtual map, called Rome Reborn, is the culmination of a ten-year-old project spearheaded by Bernard Frischer, director of The Institute for Advanced Technology in the Humanities at the University of Virginia, and Diane Favro, director of Experiential Technologies Center in UCLA, plus a team of 3D modelling and scanning experts from University of Virginia and the Politecnico di Milano.

Scanning every street corner, archway and column may have been the easy part. The next ambition is to bring Ancient Rome to modern-day netizens. At 800 megabytes, the map is too dense to host on the web for people to take a stroll through. As Frischer explains, “once you move through this world, all the polygons have to be recalculated at least thirty times per second to give the illusion of fluid motion. The computer has to make computations of hundreds of thousands of polygons, and add to that half a million simultaneous users.”

The bandwidth required would be enormous – supercomputer enormous, he says. That is unless you could develop a nimble, Second Life-style version that would cheat on the polygon crunching, opting to consider just the crucial bits – no more than a few hundred million polygons, say – that add the depth and perspective to a scene while leaving the remaining hundred million or so unchanged. “Like a big mash-up,” Frischer says with increasing animation.

Frischer has been in talks with Linden Labs and other online “multiverse” pioneers to bring Rome Reborn to the masses. (At the moment, the Rome Reborn map is more a guided tour than a virtual world where you can freely walk around.) Still, it could be some time before we see ancient Roman avatars setting up shop to repair chariot wheels or peddling designer terracotta jugs to fellow digitised Romans.

But Frischer is convinced that virtual worlds are the future for studying ancient civilisations. Digging in the dirt at archaeological sites is still essential to fill in details about the aesthetics of antiquity. But to truly understand a civilisation, scholars need to immerse themselves in that world, he says, by transacting in the ancient currency, abiding by the rules of engagement of the day. From such transactions come a deeper understanding of the way ancient peoples may have interacted, how they settled disputes, how riches were amassed and dynasties formed.

Frischer envisages roles for everybody in a digital world of ancient Rome from Classics professors to teenage gamers to virtual tourists.

First, you would have the scholars, the true experts of ancient Rome. They could apply the laws of the time to the virtual world, helping, say, to set a starting value for the currency, a type of digital “denarius,” the silver pieces favoured for most transactions in ancient Rome. Those with lesser qualifications could get their start as citizens, or, possibly lower, as slaves who need to work their way up to citizenship. Finally, you have tourists. Tourists would pay a small fee to watch the digital throngs interacting on market day or taking in some gladiator games at the Colosseum.

Of course, there is a monetary aspect to this. Experts could use their knowledge to start a business in virtual Rome, Frischer imagines, earning cash while simultaneously conducting research. "They could monetise their knowledge," he says. "You could see the classics becoming a hot field of research again."

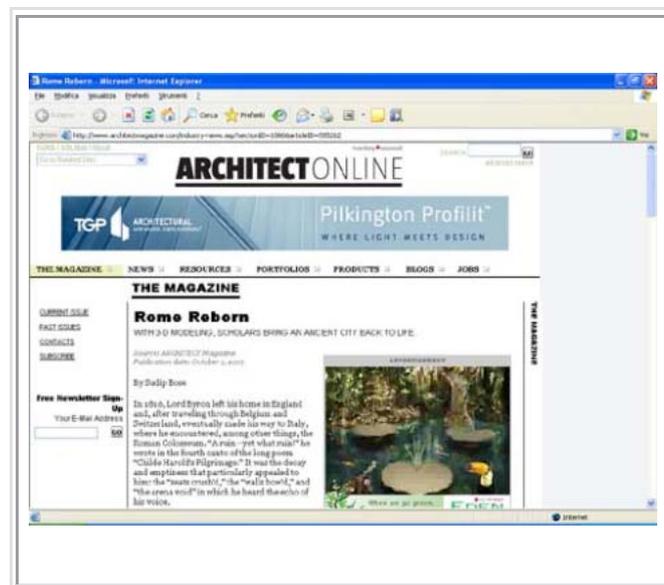
For those of you considering entering ancient Rome as a barbarian avatar, I have some bad news. This is Rome in AD320, a time of sustained domestic peace and prosperity. If you want to sack, pillage and commit other unspeakable acts, you'll have to wait another 90 years, until AD410 comes around.

## Rome Reborn

*With 3-d modeling, scholars bring an ancient city back to life*

In 1816, Lord Byron left his home in England and, after traveling through Belgium and Switzerland, eventually made his way to Italy, where he encountered, among other things, the Roman Colosseum. "A ruin—yet what ruin!" he wrote in the fourth canto of the long poem "Childe Harold's Pilgrimage." It was the decay and emptiness that particularly appealed to him: the "seats crush'd," the "walls bow'd," and "the arena void" in which he heard the echo of his voice.

That void has now, in a sense, been filled. In June, at a public ceremony in Rome, scholars from three institutions—the University of Virginia; the University of California, Los Angeles; and the Politecnico di Milano—presented the results of a 10-year collaboration: a 3-D computer model of ancient Rome. Called Rome Reborn 1.0, the project draws on archaeological evidence, literary texts, and artistic representations through the centuries to recreate what the city looked like at its peak in A.D. 320.



Rome has been modeled before. A plaster representation known as the *Plastico di Roma Antica* was created from 1933 to 1974 and can still be viewed in the city's Museum of Roman Civilization. Bernard Frischer, a classical scholar who is head of the Institute of Advanced Technology in the Humanities at U.Va., first encountered the massive model—which stretches to a length of some 50 feet—more than 30 years ago, while studying at the American Academy in Rome. He was immediately taken with it. “I grew up in a family that had humanists in it,” says Frischer, “but we had engineers among us as well. When I saw the *Plastico*, I thought, ‘Wow, we’ve got to use technology to get this wonderful model out of this room.’”

Rome Reborn is the culmination of Frischer’s three-decade-old dream. The computerized model includes monumental buildings, temples, houses, aqueducts, streets, and bridges, many of which you can see online (at [www.romereborn.virginia.edu](http://www.romereborn.virginia.edu)) in a series of images and video clips. An interdisciplinary team of specialists—archaeologists, architects, structural engineers, and textual scholars—contributed to the project, which was headed by Frischer and Diane Favro of UCLA’s classics department. In addition to the *Plastico*, the team relied on archaeological data, literary sources, and ancient plans and catalogs, such as the Severan Marble Plan of Rome (from the third century) and two fourth-century catalogs of landmarks and structures known as the *Curiosum* and *Notitia*.

The laws and principles of ancient architecture served as logical guides. “The diameter of a certain column base,” says U.Va.’s Dean Abernathy, an architect and the project’s director of 3-D modeling, “would determine the column’s height, and that would then help determine the entablature, and so on. In a building like the Pantheon, there’s so much evidence in the brick walls, for example, in the holes that tell you where and how the beams were socketed.”

The model gives scholars a “more robust understanding,” Favro says, of such buildings as the Roman Senate House, which is located in the Roman Forum. Today, after centuries of decay, the interior of that structure is spare, the mosaics and painted stucco that once decorated the walls long gone. In the model, however, the colors pop, not only on the walls but also on the floor, with its stylized rosettes and vivid greens, yellows, and reds.

“The idea wasn’t to make a hyper-realistic recreation,” says Favro, “but rather a representation based on what scholars know about the buildings of fourth-century Rome. We didn’t put in certain elements if we couldn’t confirm their existence. We might know that a certain building was painted, but we might not know which walls contained paint, or the colors.”

In many cases, the computer model has actually changed the accepted scholarly opinion about what a particular building looked like. While modeling the Basilica Aemilia, whose monumental gallery bordered the square of the Roman Forum, the team relied on a two-dimensional reconstruction done by a German scholar named Heinrich Bauer. But when the 3-D computer rendition was completed, it turned out that Bauer had misplaced a staircase. Abernathy says that such revelations, both small and large, are regular occurrences. “I would be surprised if there was no debate,” he says. “So much of this work is subjective.”

That inherent subjectivity points to the advantages of a digital model over any two-dimensional representation. “This isn’t an exact science,” Favro says. “We can never know exactly what a building looked like in antiquity. Someone can make a beautiful ink drawing of a site, but then somebody else will find a new column that belongs to the site that wasn’t known before, and now you have to revise that drawing. With digital models, you can incorporate changes easily. You can have multiple versions of a site. The model is always growing.”

The name Rome Reborn 1.0 suggests that versions 2.0, 3.0, and 4.0 will be released in the future. The next technical challenge, Favro says, is making the website interactive in real time, allowing visitors to navigate their way through the city’s ancient streets, lingering upon a temple frieze or statue. And the model will eventually move beyond A.D. 320, to document how Rome changed over time, from the late Bronze Age until the fall of the Roman Empire.

"We think we have a technical solution for running the model in real time on the internet," Frischer says, though it depends on an as-yet unofficial promise of a two-year grant from a federal agency. Putting the model online would allow hundreds of thousands of people around the world to freely explore a virtual Rome on their PCs.

Today, if you visit the Colosseum or the Roman Forum in person, you can use a handheld device—called the "Time Machine"—on which the Rome Reborn model has been loaded. Using it to navigate through the ancient structures provides "an immersive experience," Frischer says, allowing you to visually impose long-vanished architectural features on the ruins.

Rome Reborn is not meant to replace a visit to Italy. "There's a certain poignancy to a ruin," Favro says. "These models are not substitutes for going to a Roman site, where you can feel the wind and smell the smells." The future Byrons of the world could hardly be disappointed at that.

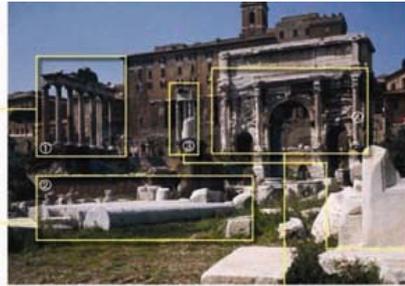


Technology 技术

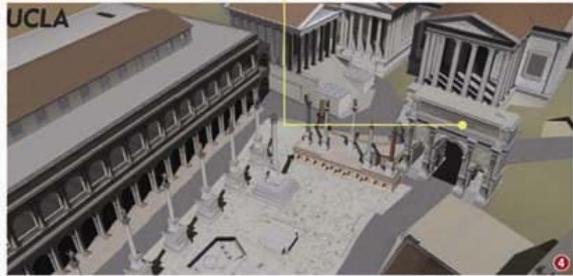
科学还原罗马可不是拍摄好莱坞大片，也不是设计新款的3D网络游戏，任何恢宏的场面都要屏除想象，尽量精确



21 quo



罗马广场是罗马城的核心，图中左侧是神庙遗址的复原图，右侧是神庙遗址的考古发掘现场。图中黄色方框标注的是神庙遗址的考古发掘现场。图中黄色方框标注的是神庙遗址的考古发掘现场。



观看台被人特地提升了2.7米，因此，研究者需要调节扫描仪与模型的角度和高度，以保证扫描数据的准确。对材料模型的扫描历时32天，扫描仪对整个模型作了环绕扫描，每一次扫描包括5000万个扫描点，并从一个单一角度对物体进行扫描，从而得出所有地方的3D形象图，这包括了从某些角度看不到的区域，将这些照片输入电脑，经过软件处理，最后一个多角

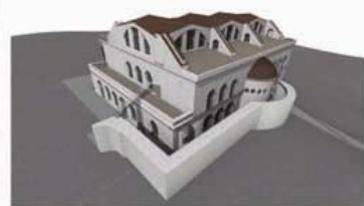
视角的形象便诞生了。在扫描过程中出现的多余的角度错误说句玩笑话，扫描的结果更加真实了。罗马的全景由此诞生了。接下来是城中的一砖一瓦，一椽一桷，对于保存比较完好的大型建筑，如罗马竞技场，需要运用 Three (Flight) (TFW) 技术结合激光扫描仪，跟踪扫描仪与扫描物体的距离，以保证扫描的完整。这就需要利用摄像头拍摄成对大物的全景，需要设置镜头与物体的距离来呈现物体的全景。

古罗马建筑特点

古罗马人追求庄严神圣中蕴藏着一种威严的雄浑感，创造出一种宏伟的雄浑感。古罗马人追求庄严神圣中蕴藏着一种威严的雄浑感，创造出一种宏伟的雄浑感。古罗马人追求庄严神圣中蕴藏着一种威严的雄浑感，创造出一种宏伟的雄浑感。

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Technology 技术



马塞勒斯神庙是罗马城中最大的神庙。上图：当年罗马神庙的平面复原图。气鼓状、黑白红相间的拱顶是神庙的标志性特征。可穿越拱顶的拱廊结构，实现了巨大的室内空间。太阳神殿的建造风格为 Trajanic，这种罗马人独特的建筑方式，成为罗马帝国建筑的重要特征。

和覆面的区域，且保证相互之间的覆盖面积不小于10%，拍摄六张照片，然后对这六张照片进行扫描。现有的软件，比如 photoshop，便足以完成这个任务。边缘相互的覆盖，是为了扫描过程中出现的变形或比例上的错误。因此，对六张照片的处理主要集中在调节比例和比例上，使它们最终成为一张完美的照片。墙面的样子也最终形成了。对于背景的处理，研究小组采取的方法是：除去背景的颜色，涂上中性的颜色。

就是那些受过高等教育的游客，都会被弄清这座城市的艰巨任务吓怕，人们越来越需要一种视觉上的辅助



“如果失去统一的标准，你将看到500个、5000个罗马！”

由 Bernard Frischer 教授主持的意大利帕维亚大学考古学研究所是世界上首次尝试利用计算机三维模型重建古迹。Frischer 教授曾于十年前领导全球不同国家的科学家合作，进行罗马数字重建的尝试。他自己领导的小组主要负责将古罗马广场和古罗马竞技场项目的重建。此前他已经在尝试进行将中世纪意大利的“圣加仑计划”进行重建的计划以及美国最大规模地城重建的计划。他同时还兼任了古罗马广场重建项目的总指挥。热心于重建古罗马遗址的 Frischer 教授，曾在自己撰写的七本专著中发表了大量关于重建古罗马广场、古罗马世界重建的文章。试图让人们了解文化遗产对人类的意义。他说：“30年前我们住在罗马，我们想知道他们看到了什么？如果有500个或5000个罗马的模型，那将是一个巨大的挑战。我们想看到它们是一样的模型，并作为一个整体来重建我们的城市。”

21 quo

对于所剩无几的废墟，则需要依靠那个模型，以及大量的文字资料。建筑师的介入面越来越清晰了。接下来的工作是，研究者要走进每个建筑里，感受内部的装饰与装饰。古罗马的墙壁、地板，就是什么花纹呢？目前，是绝对的高科技，把仍然存在的壁画进行扫描，扫描对新的扫描，用特殊手段扫描出其中的空白。一般来说，对一面墙只照一张相是不行的，而是需要将一面墙分成六个连续互

着人们会对古罗马的认识越来越多，有越来越多的东西等待光照到目之所及。重建古罗马是一项艰巨的任务。公元200年的罗马，只是现代罗马中的一个点。对于古罗马，永远不停。之因此给项目命名为“重建罗马1.0”，是因为它很特别。随着技术和考古学研究的不断进步，会有更多更精确的信息不断补充到这个数字模型中。世界无限大，留给人类的遗产永远不会有终点。而一个数字罗马只是这一切重建的开始。 ■ 原文：王军

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	La Voz de Galicia	<b>La Voz de Galicia</b>
online	14 giugno 2007	

## Roma imperial en tres dimensiones

Unas gafas serán suficientes para que los turistas puedan contemplar cómo era la Roma del tiempo de los emperadores durante sus paseos por la ciudad eterna

Además de recorrer bajo el sol las ruinas del Foro, los turistas que acudan a Roma podrán, a partir del próximo año, visitar la antigua ciudad en 3D. Serán suficientes un par de gafas y como por arte de magia se verán transportados en la Roma Imperial, al 320 d. C. bajo el mandato del emperador Constantino y podrán recorrer sus calles, sus mercados y sus monumentos. La visita virtual lleva el título de Roma Rebom ( Roma Renacida ) y ha sido creada por Bernard Frischer, profesor de la Universidad de Virginia, quien ha trabajado 10 años en el proyecto. En la web de la Universidad ya se puede ver una parte de la simulación que mostrará la evolución de la ciudad desde los primeros asentamientos en chozas, hasta los saqueos del siglo V d. C. . El sueño de los autores es ofrecer la visita virtual a través de Internet para que pueda ser estudiada y mejorada por arqueólogos de todo el mundo.

Película para turistas A la espera de solucionar los problemas técnicos y económicos del proyecto, se prepara, en colaboración con el Ayuntamiento de Roma, un película en 3D para los turistas. Como lugar de proyección se está restaurando un teatro cercano al Coliseo en el que, al precio de un billete de cine, se podrá, entre otras curiosidades, entrar en dicho anfiteatro para ver como funcionaban los ascensores en los que se transportaban los animales hasta la arena o admirar los relieves del arco de Tito. Según su creador, la proyección «preparará a los turistas que entenderán mucho mejor las ruinas» mientras el alcalde Walter Veltroni destacó el gran valor educativo del proyecto. En su realización han participado también la Universidad de California y el Politécnico de Milán que junto con la Universidad de Virginia han digitalizado la enorme maqueta de escayola construida entre 1936 y 1974 y que se conserva en el Museo de la Civilización Romana. Sobre esta base se han reconstruido unos 7.000 edificios, ocho puentes sobre el Tíber y 18 kilómetros de muros, además de acueductos, el Foro, teatros y templos. No sólo están presentes los grandes edificios públicos de la época sino que el visitante puede constatar como eran los más modestos: los talleres, las tabernas y hasta los burdeles de la ciudad.

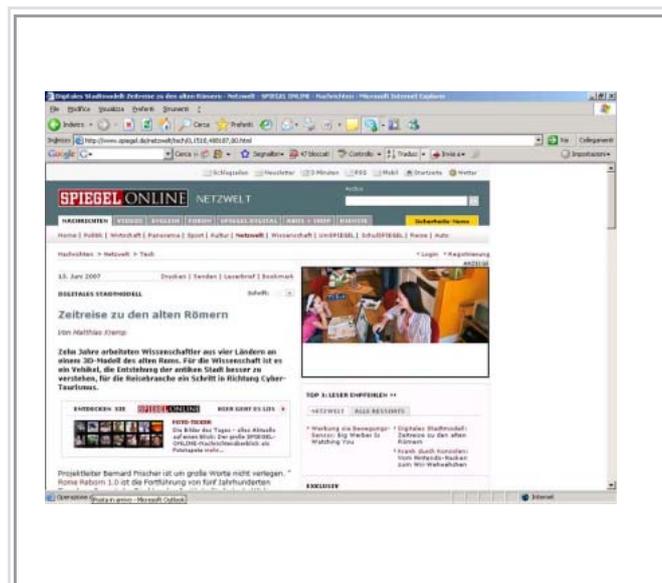


	Spiegel on line	
online	13 giugno 2007	

## Zeitreise zu den alten Römern

*Zehn Jahre arbeiteten Wissenschaftler aus vier Ländern an einem 3D-Modell des alten Roms. Für die Wissenschaft ist es ein Vehikel, die Entstehung der antiken Stadt besser zu verstehen, für die Reisebranche ein Schritt in Richtung Cyber-Tourismus.*

Projektleiter Bernard Frischer ist um große Worte nicht verlegen. "Rome Reborn 1.0 ist die Fortführung von fünf Jahrhunderten Forschung", sagt der Direktor des Instituts für fortschrittliche Technologie in den Humanistischen Wissenschaften an der Universität von Virginia. Seit der Renaissance hätten Forscher und Architekten versucht, die Ruinen des historischen Roms mit Worten, Zeichnungen und Karten zu rekonstruieren. Durch harte interdisziplinäre Arbeit habe man nun "den unmöglichen Traum realisiert". Zehn Jahre arbeitete er gemeinsam mit Kollegen aus den USA, Großbritannien, Italien und Deutschland an einer digitalen Auferstehung des antiken Roms, so wie es im Jahr 320 nach Christus ausgesehen haben könnte. Rund zwei Millionen Dollar, umgerechnet etwa 1,5 Millionen Euro, hat das Projekt, mit dem Namen "Rome Reborn" - "Rom Wiedergeboren" - bisher gekostet. Nach Angaben der Forscher ist es die bisher "größte und vollständigste Simulation einer historischen Stadt". Man mag es glauben, schließlich wurden fast alle Gebäude, die sich seinerzeit innerhalb der 13 Kilometer langen so genannten "Aurelianischen Mauern" befanden, digital rekonstruiert - insgesamt nicht weniger als 7000 Stück. Von etwa 30 Gebäuden wurden sogar die Innenräume detailliert nachgebaut, darunter das Kolosseum, das Haus des Senats und der Tempel der Venus.

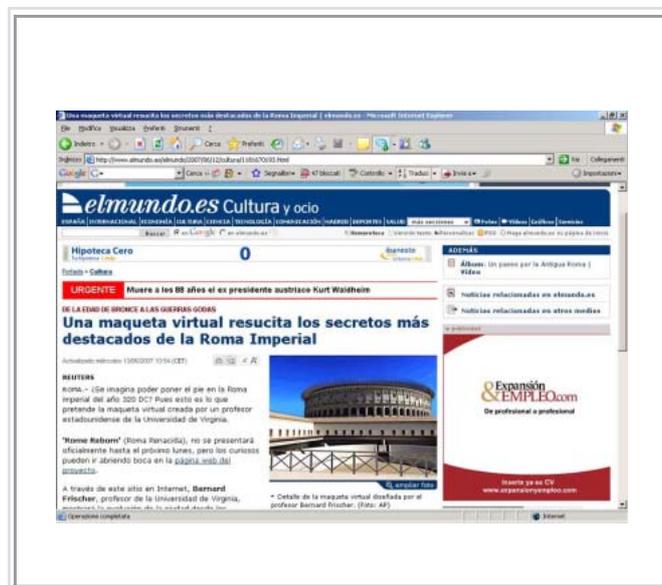


Virtuelle Stadtführungen Durch die moderne Technik, so hoffen die Wissenschaftler, werden man neue Erkenntnisse über das Leben der Römer und die Entwicklung der Stadt erarbeiten können. An den Universitäten soll es genutzt werden, um mit Studenten virtuelle Touren zu historischen Stätten zu unternehmen. Solche Stadtbegehungen sollen in Echtzeit möglich sein. Auch ist bereits angedacht, das Modell auch für virtuelle Stadtführungen mit Touristen zu nutzen. "Wir können mit den Leuten unter das Kolosseum gehen und ihnen zeigen wie die Aufzüge funktionierten, mit denen Tiere für Jagdvorstellungen aus den unterirdischen Räumen in die Arena gebracht wurden", erklärt Frischer die Detailtiefe des Modells. Erstmals sei es damit möglich, sich ein Bild davon zu machen, wie die heutigen Ruinen zu ihrer Blütezeit aussahen. Zudem soll das Modell helfen, Fragen zu klären, die bisher unbeantwortet blieben. So schwanken die wissenschaftlichen Schätzungen über die Sitzkapazität des Kolosseums laut Frischer zwischen 35.000 und 78.000 Plätzen. Mit dem 3D-Modell soll nun herausgefunden werden, wie viele Menschen tatsächlich in der riesigen Arena Platz hatten. Als Grundlage für viele der 3D-Modelle dienten den Forschern Laser-Scans des modernen Roms sowie Digitalfotos eines realen Modells der Stadt, dem "Plastico di Roma Antica". Außerdem ließen sie sich bei der Rekonstruktion von Architekten beraten. Eine Zeitmaschine in 3D Einer der beteiligten Wissenschaftler, Gabriele Guidi aus Mailand, geht davon aus, dass man die Erfahrungen aus dem Projekt nun auf weitere Städte übertragen wird. Er sagt: "Das Projekt war einen enorme technische Herausforderung, und nun, da wir ihr erfolgreich begegnet sind, ist es ein leichtes, eine Bibliothek weiterer Stadtmodelle für Museen in aller Welt aufzubauen. Dem schließt sich auch Bernard Frischer an. Für ihn ist das "Rome Reborn 1.0" "nur der erste Schritt bei Aufbau einer virtuellen Zeitmaschine, die unsere Kinder und Kindeskinde benutzen werden, um die Geschichte Roms und anderer großartiger Städte zu studieren". Vorerst aber hat er bescheidenere Pläne: Die BBC berichtet, er habe Gespräche mit Linden Labs, dem Betreiber der virtuellen Online-Welt "Second Life", aufgenommen. Wenn alles klappt, wird man das alte Rom dort bald per Avatar durchwandern können.

	Elmundo.es	
online	13 giugno 2007	

## Una maqueta virtual rescita los secretos más destacados de la Roma Imperial

¿Se imagina poder poner el pie en la Roma imperial del año 320 DC? Pues esto es lo que pretende la maqueta virtual creada por un profesor estadounidense de la Universidad de Virginia. 'Rome Reborn' (Roma Renacida), no se presentará oficialmente hasta el próximo lunes, pero los curiosos pueden ir abriendo boca en la página web del proyecto. A través de este sitio en Internet, Bernard Frischer, profesor de la Universidad de Virginia, mostrará la evolución de la ciudad desde los asentamientos de chozas de la Edad de Bronce hasta el saqueo del siglo V DC y las devastadoras Guerras Godas; pasando por el esplendor de la ciudad imperial del año 320 DC, bajo el mandato del emperador Constantino, cuando había crecido hasta alcanzar el millón de habitantes. Las imágenes se reproducirán para los turistas en dispositivos manuales guiados por satélite y en tres dimensiones en un teatro que se abrirá cerca del Coliseo. Frischer afirma que su maqueta "preparará a los turistas para su visita al Coliseo, el Foro y los palacios imperiales del Palatino, para que así puedan entender las ruinas mucho mejor". "Podemos trasladar a la gente bajo el Coliseo y mostrarles como funcionaban los ascensores que subían a los animales desde las habitaciones subterráneas", añade Frischer refiriéndose al gran anfiteatro romano inaugurado por Tito en el año 80 DC. El modelo de Frischer tiene sus fuentes en mapas antiguos y catálogos que detallan "edificios de aparcamientos, casa privadas, posadas, instalaciones de almacenamiento, panaderías e incluso burdeles". La maqueta también incluye imágenes digitales del enorme "Plástico di Roma Antica", construido en escayola en París entre 1936 y 1974 y que mide 16 metros de ancho por 17 de largo.



	Frankfurter Allgemeine	
online	13 giugno 2007	

## Alle Zeitreisen führen nach Rom

Wer mal im Museo della Civiltà Romana gewesen ist, im Süden Roms, der wird sich kaum satt gesehen haben an einem riesigen Modell. Man schaut aus zwei, drei Metern Höhe darauf herab, man kann herumlaufen - und staunen. Das Modell zeigt Rom im Jahr 320 nach Christus, zur Zeit Konstantins. Vierzig Jahre haben Fachleute an den Details gearbeitet, an jedem einzelnen Badehaus wie am Kolosseum, und wenn man Filmkritiker ist, denkt man sofort an Orson Welles' Ausruf, als er das erste Mal ein Filmstudio betrat: das sei "die größte Modelleisenbahn, die je ein Junge hatte". Inzwischen denken große Jungs eher an Computerspiele, und da passt es gut, dass der Altertumswissenschaftler Bernard Frischer, der an der Universität von Virginia das "Institute for Advanced Technology in the Humanities" leitet, zusammen mit anderen Experten aus Los Angeles und Mailand ein virtuelles Rom gebaut hat. "Rome Reborn", diese Woche in Rom präsentiert, ist eine 3D-Computerrekonstruktion der Stadt, wie sie im Museumsmodell zu sehen ist. Zwei Millionen Dollar hat diese Animation gekostet, zehn Jahre hat die Arbeit gedauert. Im Moment liegt dieses virtuelle Rom unter der Adresse <http://www.romereborn.virginia.edu/>, leider sind es nur vier Rundgänge übers Forum, durch Kolosseum, Circus Maximus und die Maxentius-Basilica, weil die technischen Möglichkeiten fehlen.



Es sei nur ein Anfang, hat Frischer dem Magazin "Newsweek" gesagt - nicht nur, weil es keinen adäquaten Server gibt. Es gibt, was bei einer amerikanischen Institution kaum zu fassen ist, auch keinen Business-Plan. Doch Frischer träumt von neuen Möglichkeiten, von einem "Google Earth mit Zeitleiste" zum Beispiel, einer Software, bei der man das Jahr 1500 anklickt oder auch das Jahr 44 vor Christus und sich wie in einer Zeitmaschine fühlen darf. Da träumt man

gerne mit - und wundert sich, dass der Mann noch nicht mit einem Hollywoodstudio ins Gespräch gekommen ist. Was liegen da für Möglichkeiten! Man könnte virtuelle Studios bauen, 2.0-Versionen der alten Backlots, auf denen ein afrikanischer Dschungel neben einer New Yorker Straße und ein Pariser Bistro neben einer Westernstadt lag. Es wäre ein Paradies für alle Historienfilme, für die nicht mehr mühsam ein Stück Forum Romanum oder eines Londoner Slums in der Frühphase der Industrialisierung nachgebaut werden müsste. In den Rechnern schlummerten lauter vergangene Welten. Man darf natürlich nicht verschweigen, dass das wiedergeborene Rom, wie wir es derzeit auf dem Bildschirm sehen können, noch ein wenig klinisch wirkt; aber den Schmutz und die Abfälle einer Mietskaseme, die Gebrauchsspuren im Kolosseum digital zu rekonstruieren, das sollte auf Dauer kein ernsthaftes Problem sein für die Computerartisten, die ja auch Shreks schmutzeligen Sumpf prima hingekriegt haben.



aprender mientras uno se divierte, gracias a un instrumento de gran valor educativo». El programa informático es gigantesco, pero la Universidad de Virginia ha colgado en su página Web algunas muestras que permiten hacerse cargo de las características de un proyecto que ha cambiado forma y objetivos a medida que los avances en tecnologías informáticas permitían ampliar su alcance. El coste supera los dos millones de dólares y seguirá creciendo a medida que se desarrollan nuevos usos, pero crecen todavía más rápido los resultados económicos. El Teatro Colosseo permitirá acoger cada año a un millón doscientos mil espectadores, justo a dos manzanas del monumento más visitado en Roma, que es precisamente el Coliseo. Por otra parte, es un dinamizador del turismo, pues quien visita la «Roma virtual» siente un deseo irresistible de ir a ver la verdadera.

	BBCmundo.com	
online	12 giugno 2007	

## Resucitan a la Roma antigua

*La Roma antigua ha vuelto a la vida a través de un extraordinario proyecto de reconstrucción digital, considerada la mayor simulación por computadora del mundo.*

Un equipo internacional de arquitectos, arqueólogos y expertos en informática pasó diez años creando un modelo tridimensional de la ciudad, llamado "Rome Reborn" ("Renace Roma"). Se escaneó información de unos 7.000 edificios, que fueron reproducidos con ayuda de un modelo de la ciudad, el enorme *Plastico di Roma Antica*, que forma parte de la colección del Museo de la Civilización Romana, en la capital italiana. La simulación lleva a los usuarios al año 320, en la época del emperador Constantino, cuando la ciudad tenía cerca de un millón de habitantes. "Podemos conducir a la gente al interior del Coliseo y mostrarles cómo funcionaban los elevadores para trasladar a los animales de las cámaras subterráneas a la arena donde eran cazados", dijo Bernard Frischer, jefe del proyecto y director del Institute for Advanced Technology in the Humanities, de Virginia, Estados Unidos. La simulación permite explorar el interior de unos 30 edificios -incluidos el Senado, el Coliseo y la basílica del emperador Majencio- y ver sus pinturas y decoraciones. El proyecto es producto de una colaboración entre la Universidad de Virginia, la Universidad de California en Los Ángeles e institutos de investigación de Italia, Alemania y el Reino Unido. Un panel de arqueólogos estudió cómo se verían las estatuas y monumentos si no hubieran sido oscurecidos por la contaminación. Además, se emplearon mapas y catálogos antiguos, que ofrecían detalles de "edificios de apartamentos, casas privadas, hosterías, almacenes, panaderías y hasta prostíbulos", dijo Frischer.



Segunda Vida El proyecto se utilizará para seguir investigando cómo se vivía en la Roma antigua. Éste es el primer paso en la creación de una máquina del tiempo virtual, que nuestros hijos y nietos usarán para estudiar la historia de Roma y de muchas otras grandes ciudades de todo el mundo También se actualizará cuando haya nuevos descubrimientos arqueológicos. "Éste es el primer paso en la creación de una máquina del tiempo virtual, que nuestros hijos y nietos usarán para estudiar la historia de Roma y de muchas otras grandes ciudades de todo el mundo", señaló Frischer. "Por ejemplo, en la literatura especializada el Coliseo goza de una

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gran reputación como un lugar en el que la gente podía encontrar sus asientos con gran facilidad, pero los estimados sobre su capacidad varían enormemente, desde 35.000 hasta 78.000 personas", añadió. Según informes, los realizadores del proyecto están debatiendo con la empresa Linden Labs la posibilidad de poner la simulación completa a disposición de los internautas, a través de su mundo virtual Segunda Vida. Las animaciones tridimensionales basadas en la simulación podrían permitirles a los turistas preparar sus viajes al Coliseo, el Foro o los palacios imperiales en el Palatino.

	India Times	<b>indiatimes</b>
online	12 giugno 2007	

## Ancient Rome rebuilt in virtual model

Tourists puzzled by the jumble of buildings in classical and modern Rome can now find their bearings by visiting a virtual model of the imperial capital in what is being billed as the world's biggest computer simulation of an ancient city. "Rome Reborn" was unveiled this week in a first release showing the city at its peak in 320 AD, under the Emperor Constantine when it had grown to a million inhabitants. Brainchild of the University of Virginia's Bernard Frischer, Rome Reborn ([www.romereborn.virginia.edu](http://www.romereborn.virginia.edu)) will eventually show its evolution from Bronze Age hut settlements to the Sack of Rome in the 5th century AD and the devastating Gothic Wars. Reproduced for tourists on satellite-guided handsets and 3-D orientation movies in a theatre to be opened near the Colosseum, Frischer says his model "will prepare them for their visit to the Colosseum, the Forum, the imperial palaces on the Palatine, so that they can understand the ruins a lot better". "We can take people under the Colosseum and show them how the elevators worked to bring the animals up from underground chambers for the animal hunts they held," he said, referring to the great Roman amphitheatre inaugurated by Titus in 80 AD. Frischer's model is sourced from ancient maps and building catalogues detailing "apartment buildings, private houses, inns, storage facilities, bakeries and even brothels", plus digital images of the vast "Plastico di Roma Antica" model built from plaster of Paris in 1936-74, which measures 16 by 17 meters. The "reverse modeling" by Frischer and the Politecnico di Milano and University of Florence enables scholars to populate ancient monuments with virtual reality figures for experiments on practical details like ventilation, capacity or acoustics. "For example, in scholarly literature the Colosseum has a great reputation for being a great people mover where people could find their seats very quickly. But estimates of the carrying capacity vary wildly from 35,000 to 78,000," he said. Engineers have populated his model with virtual spectators to narrow down that estimate to 48,000-50,000 people. The model can also show how the Romans, who worshipped the sun and moon, aligned their buildings with the summer solstice.



	World-science.net	<b>WORLD SCIENCE</b>
online	12 giugno 2007	

## Rome reborn in virtual glory

An international group of archaeologists, architects and computer specialists have recreated ancient Rome in a three-dimensional computer simulation. The Italian, British, U.S. and German team used laser scanners and virtual reality to build what they called the biggest, most complete simulation of an historic city to date. A still image from the "Rome Reborn." For videoclips, click on image, then click on "gallery," then on "video clips." The simulation, "Rome Reborn 1.0," shows almost the whole city within the 13milelong Aurelian Walls as it appeared in 320 A.D. Rome was then the capital of the western world and had reached its peak of development with an estimated one million inhabitants. Rome's mayor officiated on June 11 at the first public viewing of the re-con-struc-tion. It is the fruit of a 10year project based at the University of Virginia in Charlottesville, Va., and begun at the University of California, Los Angeles.



Users can navigate through the model freely, moving up, down, left and right. They can enter major public buildings such as the Roman Senate House, the Colosseum, or the Temple of Venus and Rome, the ancient city's largest place of worship. As new discoveries are made, "Rome Reborn 1.0" can be easily updated to reflect the latest knowledge, developers said. Future releases of the program are to include other phases in the evolution of the city from the late Bronze Age in the 10th century B.C. to the Gothic Wars in the 6th century A.D. Videoclips and still images of "Rome Re-born 1.0" can be viewed at [www.romereborn.virginia.edu](http://www.romereborn.virginia.edu). In recent years scientists, historians and archaeologists have embraced 3D modeling of historic

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sites. Information technology has let them recreate buildings and monuments that no longer exist or to digitally restore sites damaged with time. The results can be used both in research to test new theories and in teaching to take students on virtual tours. "Rome Reborn" is billed as the most ambitious such project ever undertaken. It's "the continuation of five centuries of research by scholars, architects and artists since the Renaissance who have attempted to restore the ruins of the ancient city with words, maps and images," said Bernard Frischer, director of the "Rome Re-born" project and director of the Institute for Advanced Technology in the Humanities at the University of Virginia. "The project was an enormous technical challenge, and now that we have successfully met it, we can easily start building up a library of other city models in museums around the world," added Gabriele Guidi of INDACO Lab at Politecnico di Milano, a university in Milan that collaborated in the project.



The virtual Rome hopes to render intelligible what Frischer calls the often “confusing mess” of ancient ruins. A viewer can navigate through the buildings and plazas of the Forum, stroll past the Temple of Vesta, wander through the massive Basilica of Maxentius past the ship’s prows of the Rostra where speakers addressed crowds, and through the Arch of Septimius Severus with its bas reliefs of beaten Parthians bowing to their Roman conquerors. At the Colosseum, visitors can cruise the stone seats, walk the arena floor or even drop below ground level to look at the elevator cages that hoisted the lions and tigers into the arena to battle hunters.

In a telephone interview with NEWSWEEK’s Andrew Murr, Frischer says although Rome Reborn caps his 30-year dream to make a high-tech visualization of the ancient city, it’s also “a beginning.” An Italian company plans to use portions of it in a video to orient tourists at the Colosseum, and he hopes that future scholars may be able to reconstruct buildings like the Pantheon that the team hasn’t modeled in detail. Excerpts:

*NEWSWEEK: So what is Rome Reborn?*

Bernard Frischer: Rome Reborn is an international project started by Diane Favro and myself in 1996 to realize the dream that scholars have had since the Renaissance to rebuild ancient Rome, or at least to give us a sense of what ancient Rome really looked like. The project was named after [a book written] by the first person to have this dream as far as we know, Flavio Biondo. He was a papal secretary and in the 1440s wrote the founding text of Roman archaeology, and probably of world archaeology, called *Roma Instaurata* or *Rome Restored*. We made the name more colloquial, so we settled on Rome Reborn.

*How does a viewer experience it?*

Flavio was trying to do it with words. As time went on, scholars and cartographers used different methods like mapping and 2-D reconstructions, and then 3-D reconstructions. I’m thinking of the great plaster of Paris reconstructions started in the 1930s and finished in the 1970s (at the Museum of Roman Civilization). Our approach was to use digital technology. What we’ve made is a real-time 3-D model of ancient Rome in about the year 320 A.D. It’s not a piece of video that locks you on a certain itinerary that somebody else chose for you. You can explore at will, depending on your desires or interests or curiosity leads you. They can move forward and back, up and down, change their angle of view. That’s the beauty of what we’ve made. What we have shown is Rome at the peak of development in late antiquity...(Visitors) can see the whole urban settlement within the Aurelian walls, which were built in the 270s A.D., and extend for 18 kilometers, more or less in a circle, (enclosing about 25 square kilometers). We have highly detailed models of buildings like the Colosseum, the Imperial Fora and the Roman Forum, which includes law courts, temples, basilicas and monuments. These we have actually included in the model in much greater detail, not only the exteriors, but in many cases the interiors, where there is enough evidence to allow us to do that. In addition, we have included thousands of other buildings in the background in much less detail.

*How could you be sure of the details of the famous buildings you modeled?*

It’s not the Rome Reborn team so much that is designing the buildings. It’s the scholars on our advisory committees who are doing it. The first thing we have to do in modeling a building is find the best couple of scholars who have been working on a site for many years, the recognized authorities. I can’t think of anyone who ever turned us down, because from kids to senior scholars, everybody is fascinated with 3-D technology. The scholars gave us data, and we would pop it up into 3-D on the computer. Then as scholars see it, they critique it, and as they see from the way we interpreted their data, that maybe their own understanding of the building may have been deficient and needs to be revisited. Very often, the very act of making a digital 3-D model results in insights for the experts themselves.

*What’s a good example?*

Engineers at the University of Zaragoza under the direction of Prof. Diego Gutierrez used our model of the Colosseum to study the efficiency of the Colosseum as a people mover. Their point of departure was an observation by our head modeler, architect Dean Abernathy, that

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there is a bottleneck corridor through which the majority of spectators had to pass. It is the only corridor that has no direct sunlight. It also had a lower ceiling and was narrower than the other corridors of the structure. Abernathy speculated that movement through this corridor would have been slow and somewhat unpleasant. The Zaragoza team populated our model of the Colosseum with Artificial Intelligence figures who were "smart" enough to know how to walk from the entrance to their seats without bumping into one another, hitting a wall or tripping on the stairs. The simulation of these AI figures walking through that narrow corridor confirmed Abernathy's hunch about the bottleneck. Before a model restoring the entire Colosseum to its ancient condition existed, no one had ever made this observation. This is not surprising since the corridor in question is closed to the public and is poorly preserved. I doubt that very many scholars have even seen it during the last hundred years. It's hard to have ideas about what you can't see. In case of a law court in the Roman Forum, the Basilica Aemilia, we discovered that a German scholar whose work we used failed to carry a staircase through to the top floor of the building. So his reconstruction wouldn't have worked at all. This is very natural. When you are working in two dimensions you fudge things. You don't know where every window was and every doorway because a lot of the superstructure of an archaeological ruin doesn't survive. So when you have to do a section of a building you do it through the area that offers the most surviving information. But when you make a 3-D model you can't cheat, you can't cut corners. You've got to reconstruct everything. So scholars are always finding that they hadn't thought about some part of a building. There are also problems of illumination. Where were the windows? When we did the Church of Santa Maria Maggiore (built in the 430s), scholars hadn't thought about the colors of the stucco on the inside of the church. They weren't forced to think about it. They were only thinking about the things for which there was evidence, not things for which there wasn't. At those points, the scholars either have to do new research to see if there is any evidence, however slender, or they start arguing by analogy from evidence of buildings of the same type and period that survive elsewhere. They settled on a light gray.

*How does a virtual 3-D model help experts visualize how buildings like the Colosseum looked and worked?*

I've been going to the Colosseum for years. And what I'm about to confess is true of a lot of my colleagues. You go to the Colosseum, you look at the remains of those underground chambers, which are what you mainly see today, and it just is a confusing mess. It's a confusing mess for good reasons. It represents the random ruins of four different phases of construction, all jumbled together. Well, there's a brilliant engineer and archaeologist at the German Archeological Institute in Rome named Heinz Beste. And Heinz took on the project of disentangling all these ruins and sorting them out. He identified the different phases and made drawings reconstructing how each phase worked. He kindly agreed to work with us and helped us to understand the fourth and final phase, which is consistent with the period we modeled. He was able to show us where were the walls, where were the corridors, where were the chambers for the animals, where were the chutes they forced the animals through and where were the elevators they forced them into through the chutes. That's how they could be brought up through the wood planking of the floor of the Colosseum through trap doors into the arena, where they would then fight each other or attack the armed hunters who in the entertainments there would try to kill the animals before the animals killed them.

*When did you first think you wanted to make a digital 3-D model of ancient Rome?*

I can still remember when I got the idea. It was when I was a fellow in the American Academy in Rome, and I went out to the Museum of Roman Civilization, and I saw the great plaster of Paris model of ancient Rome, the *Plastico Roma antica*, made by Italo Gismondi and a team of model makers from 1933 to 1973. I was seeing it in 1976, so it was just finished. I was there with an urban designer or planner from Berkeley named Donald Appleyard. He said, "I'm doing something at Berkeley that could really help here. We've developed a video editing system that allows us to composite video of real places with models of proposed buildings that will be inserted into those places." He said this visualization system is very helpful to planning commissions and the general public and even to architects in trying to see what the impact of a new building would be on a city. He said we could take that same system and capture the *Plastico*. That gave me the idea that we could [use] technology to get this breathtaking model

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of ancient Rome and get it outside the walls of the museum and get it into the hands of students and scholars and the general public. Unfortunately, Donald died a few years later, before we could get started ... I'm always fascinated and amazed that I've lived to see this. I still find it very moving. You never become indifferent to it. It still sends shivers up my spine.

*You are unveiling this in Rome. Will it be available there in some fashion?*

It will be available, because a company based in Rome called Past Perfect Productions has secured the worldwide license from the Regents of the University of California, who own it. Their intention is to open an orientation theater across the street from the Colosseum, which they have purchased in recent months, and convert an old playhouse into an orientation center, where people coming to Rome can, very quickly, by seeing the model, understand what it is they are about to visit, either across the street at the Colosseum, or up the road at the Roman Forum or up the hill overlooking the Roman Forum at the Palatine.

*How will they present it?*

You should talk to them, but as I understand it, their latest thinking is to have a work of fiction that involves some sort of movement through the central city and by having an entertaining story to keep people interested but to also implicitly do a lot of instruction. There's also already in service in the Colosseum and the Forum a handheld device that weighs only two pounds with a very luminous and big screen of five inches that has GPS and wireless sensors in it (so) it knows your position. And as you move around the Colosseum, it puts on the screen views of the model that are appropriate to your position. This they call the Time Machine. It can already be rented at the ticket office to the Colosseum and to the Palatine, that central archaeological park that overlooks the Forum. It has images that exactly correspond to your position and the thing you are looking at. This is a wonderful device that was developed at the University of Bologna in the department of electrical engineering and then licensed to Ducati Systems. ... In this area of 3-D modeling and applying the technology to tourism, as far as I know the Italians are really the leaders in the world. I think this device is a good example.

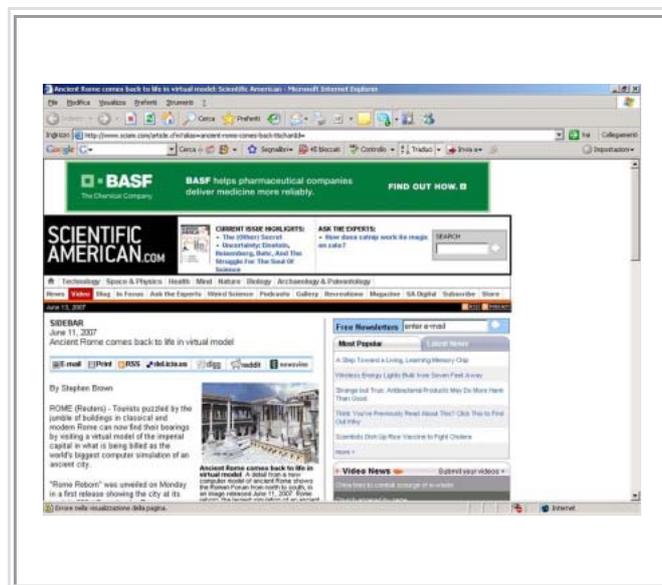
*What other applications do you envision?*

Good question. Not too much has come to pass yet. We're still in the mode of creating the models, and the applications can really only come once we have a collection of models. Our institute at IATH has a National Science Foundation grant to develop a database of scientific models of cultural heritage sites around the world and we call it SAVE, for Saving and Archiving Virtual Environments. Right now your readers can't download and use the Rome model. But if SAVE is implemented in a few years, they will be able to, and they will be able to download many other cultural heritage sites around the world. I like to think of SAVE as sort of Google Earth with a time bar. You have a model of the earth, and you move the bar back to 1500, and little red dots appear every place where there is a model. Or 500 B.C. Same thing. Then you can fly down from outer space into the models the way you can with Google Earth. I think that's coming. One has to wonder whether the next application of this might be in the context of Second Life of Linden Lab. SAVE could be a kind of island which you could call "Past Life." Second Life is now very hot among technologists and the general public, but it's also very hot among educators. A number of universities have bought islands. Certainly a number of companies have. It would be interesting to see there's any way if we could port over this Rome model and other models to Second Life, where there is already this enormous, growing virtual community of people who wander around and build things. Wouldn't it be nice to build up the detail of the Rome model by allowing the public to contribute? We might be able to get all that added detail that we want in other time periods much, much faster that way. And if we had a sort of Wiki approach, a Wikipedia approach, even though there would be unqualified people contributing and messing up a building in Rome, the research of the Wikipedia suggests that any terrible errors would be detected and corrected by this self-policing and self-correcting virtual community.

	www.sciam.com	
online	11 giugno 2007	

## Ancient Rome comes back to life in virtual model

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Reproduced for tourists on satellite-guided handsets and 3-D orientation movies in a theatre to be opened near the Colosseum, Frischer says his model "will prepare them for their visit to the Colosseum, the Forum, the imperial palaces on the Palatine, so that they can understand the ruins a lot better." "We can take people under the Colosseum and show them how the elevators worked to bring the animals up from underground chambers for the animal hunts they held," he said, referring to the great Roman amphitheatre inaugurated by Titus in 80 AD. Frischer's model is sourced from ancient maps and building catalogues detailing "apartment buildings, private houses, inns, storage facilities, bakeries and even brothels," plus digital images of the vast "Plastico di Roma Antica" model built from plaster of Paris in 1936-74, which measures 16 by 17 meters. The "reverse modeling" by Frischer and the Politecnico di Milano and University of Florence enables scholars to populate ancient monuments with virtual reality figures for experiments on practical details like ventilation, capacity or acoustics. "For example, in scholarly literature the Colosseum has a great reputation for being a great people mover where people could find their seats very quickly. But estimates of the carrying capacity vary wildly from 35,000 to 78,000," he said. Engineers have populated his model with virtual spectators to narrow down that estimate to 48,000-50,000 people. The model can also show how the Romans, who worshipped the sun and moon, aligned their buildings with the summer solstice.

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## La Roma clásica renace en una gran maqueta virtual

Los turistas que anden confundidos con la amalgama de edificios en Roma pueden orientarse desde hoy con la maqueta virtual de la capital imperial de la que se considera la más grande simulación por ordenador de una ciudad antigua. Rome reborn (Roma renacida) se ha presentado hoy con una primera entrega que muestra la ciudad en su punto más álgido, en el 320 después de Cristo, bajo el emperador Constantino, cuando en ella vivían un millón de habitantes. Elaborada por Bernard Frischer, de la Universidad de Virginia, Rome reborn mostrará en el futuro la evolución desde las cabañas de la edad de bronce hasta el saqueo de Roma del siglo V después de Cristo y las devastadoras guerras contra los bárbaros. Basada en mapas antiguos y catálogos de edificios Los turistas podrán seguir la visita virtual en aparatos portátiles guiados por satélite y en películas en tres dimensiones que se proyectarán en un teatro cerca del Coliseo. Frischer asegura que su maqueta preparará a los visitantes antes de ver el Coliseo, el foro y los lugares imperiales del Palatino, "para que puedan entender mucho mejor las ruinas". "Podemos llevar a la gente bajo el Coliseo y mostrarles cómo los montacargas subían a los animales desde las cámaras subterráneas para los espectáculos de caza", ha afirmado, sobre el gran anfiteatro romano inaugurado por Tito en el 80 después de Cristo. La maqueta de Frischer se basa en mapas antiguos y catálogos de edificios que detallan los bloques de apartamentos, casas privadas, tabernas, almacenes, panaderías e incluso burdeles, sumados a imágenes digitales del Plastico di Roma Antica, maqueta realizada en yeso en París en 1936-74, que mide 16x17 metros. Experimentos sobre la capacidad y la acústica de los monumentos La maqueta elaborada por Frischer, el Politecnico di Milano y la Universidad de Florencia muestra cómo los romanos, que veneraban el sol y la luna, alinearon sus edificios con el solsticio de verano. El nuevo modelo permite a los investigadores hacer experimentos sobre la ventilación, la capacidad y la acústica de los monumentos antiguos llenándolos de figuras de realidad virtual. Frischer pone como ejemplo el Coliseo, un espacio que se caracterizaba por permitir a los asistentes encontrar rápidamente su sitio. Según qué estudiosos lo calcularan, la capacidad del anfiteatro podía variar entre 35.000 y 78.000 personas. Los ingenieros que han estudiado la maqueta con espectadores virtuales han concretado que el aforo era de entre 48.000 y 50.000 personas.



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## Ancient Rome Rebuilt Digitally

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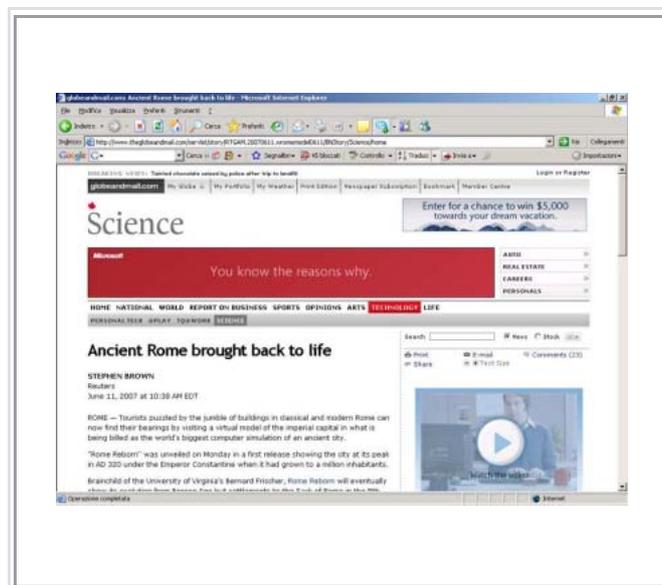
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results can be used both in research to test new theories and in teaching to take students on virtual tours of the historical sites they are studying. By several orders of magnitude, "Rome Reborn 1.0" is the most ambitious such project ever undertaken. Bernard Frischer, director of the "Rome Reborn" project and director of the Institute for Advanced Technology in the Humanities at the University of Virginia, stated, "'Rome Reborn 1.0' is the continuation of five centuries of research by scholars, architects and artists since the Renaissance who have attempted to restore the ruins of the ancient city with words, maps and images. Now, through hard work by our interdisciplinary team, we have realized their seemingly impossible dream. This is just the first step in the creation of a virtual time machine, which our children and grandchildren will use to study the history of Rome and many other great cities around the world. We give special thanks to the Comune di Roma and its Museum of Roman Civilization (Rome) for the constant support and encouragement they gave the project from the start." Diane Favro, co-initiator of "Rome Reborn" and director of the Experiential Technologies Center at UCLA said, "This amazing model allows us to appreciate individual buildings of ancient Rome within a broad urban context, and thus also to understand how the modern city took shape over time. Numerous UCLA students explored advanced technology and global resources to create the Rome Reborn model, an experience that transformed them from students into 21st century scholars." Gabriele Guidi of INDACO Lab at the Politecnico di Milano said, "This is the first time that engineers have succeeded in creating a hybrid computer model of an entire city based on born-digital and reborn-digital elements. The project was an enormous technical challenge, and now that we have successfully met it, we can easily start building up a library of other city models in museums around the world." The "Rome Reborn" project was begun at UCLA in 1996 by professors Favro and Frischer. They collaborated with UCLA students from classics, architecture and urban design who fashioned the digital models with continuous advice from expert archaeologists. As the project evolved, it became collaborative at an international scale. In 2004, the project moved its administrative home to the University of Virginia, while work in progress continued at UCLA. In the same year, a cooperative research agreement was signed with the Politecnico di Milano. Many individuals and institutions contributed to "Rome Reborn" including the Politecnico di Milano (<http://www.polimi.it>), UCLA (<http://www.etc.ucla.edu/>), and the University of Virginia (<http://www.iath.virginia.edu>). The advisors of the project included scholars from the Italian Ministry of Culture, the Museum of Roman Civilization (Rome), Bath University, Bryn Mawr College, the Consiglio Nazionale delle Ricerche, the German Archaeological Institute, Ohio University, UCLA, the University of Florence, the University of Lecce, the University of Rome ("La Sapienza"), the University of Virginia and the Vatican Museums. The first sponsors of the project were Kirk Mathews and the Creative Kids Education Foundation. Other sponsors have included: Alitalia, the Institute for Advanced Technology in the Humanities at the University of Virginia, Intel, Microsoft, Multigen-Paradigm, the National Science Foundation, The Rose Family of New York, Shuttle, Tecmark Italia, UCLA Academic Technology Services, the UCLA College of Arts and Letters, the UCLA Division of Humanities, and the UCLA School of the Arts and Architecture.

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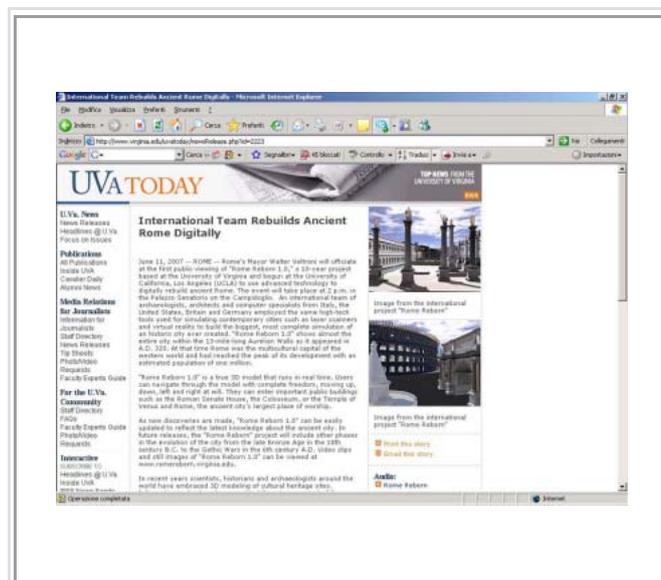
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	UVA Today	
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## International Team Rebuilds Ancient Rome Digitally

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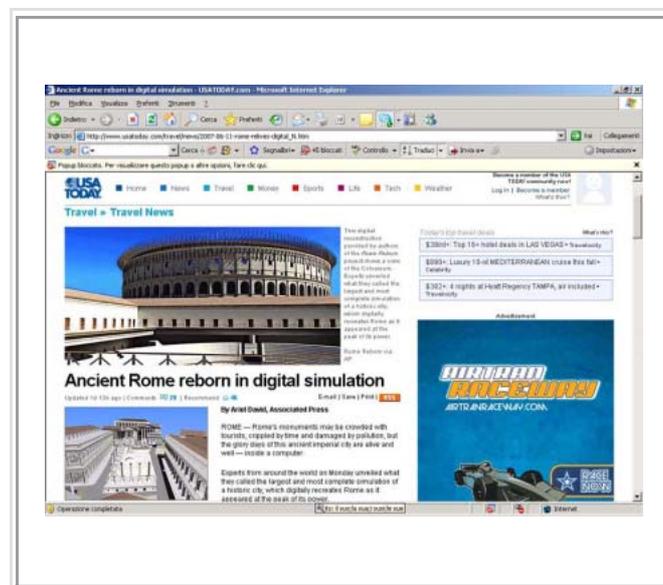
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## Ancient Rome reborn in digital simulation

*This digital reconstruction shows a view of the ancient Roman Forum.*

Rome's monuments may be crowded with tourists, crippled by time and damaged by pollution, but the glory days of this ancient imperial city are alive and well — inside a computer. Experts from around the world on Monday unveiled what they called the largest and most complete simulation of a historic city, which digitally recreates Rome as it appeared at the peak of its power. When in virtual Rome, visitors will be able to do even more than ancient Romans did: They can crawl through the bowels of the Colosseum, filled with lion cages and primitive elevators, and fly up for a detailed look at bas-reliefs and inscriptions placed atop triumphal arches. The simulation shows Rome in A.D. 320, at the time the emperor Constantine, and reconstructs some 7,000 buildings of a vibrant and cosmopolitan city that housed about 1 million people, said Bernard Frischer, an expert from the University of Virginia who led the project. Thanks to laser scans of Rome today and advice from archaeologists, experts have rebuilt almost the entire city within its 13-mile-long wall using the same computer programs architects use to plan new constructions, said Frischer, who heads Virginia's Institute for Advanced Technology in the Humanities. The simulation reconstructs the interior of about 30 buildings — including the Senate, the Colosseum and the basilica built by the emperor Maxentius — complete with frescoes and decorations. Advice from a panel of archaeologists allowed experts to show statues and monuments as they would appear without the dark smudges left by pollution.



They also were able to recreate with a "high probability" of accuracy buildings that are now almost completely in ruins, such as the temple dedicated to the goddesses Venus and Roma and the Meta Sudans, a fountain that stood near the Colosseum, Frischer said. The \$2 million

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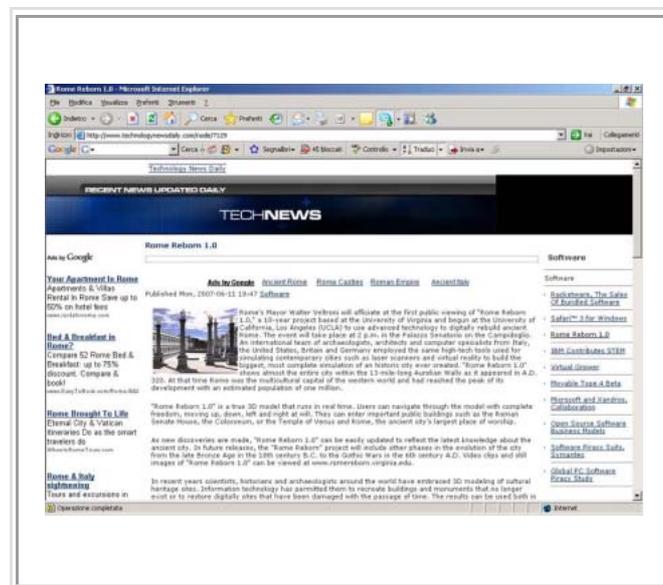
Rome Reborn simulation was created over 10 years by an international team of archaeologists, architects and computer specialists from the University of Virginia and UCLA, as well research institutes in Italy, Germany and Britain, he said. The simulation will be useful for scientists to run experiments — for example to determine the crowd capacity of the ancient buildings — and as a new kind of scholarly journal that will be updated each time a new discovery is made on one of Rome's ancient marvels. It also is of value for students and tourists visiting Rome, Frischer said at a presentation of the work in Rome's city hall. "This is the first step in the creation of a virtual time machine, which our children and grandchildren will use to study the history of Rome and many other great cities around the world," he said. Sections of the simulation are available on the Internet. The website only offers images and videos of the simulation, since allowing simultaneous access to potentially thousands of users would require enormous computer power, Frischer said. He said talks had begun with Linden Labs, based in San Francisco, California, to make the entire simulation available on the Internet through the company's virtual world Second Life. A group of private companies also plans to open in April 2008 a theater near the Colosseum that will feature interactive, 3D animations based on the simulation, Rome officials said. The original simulation does not include any characters, but the commercial project would be populated by thousands of figures, some of them based on skeletons and other archaeological finds unearthed in Rome and across Italy.

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