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Interactive Education and Research  
151 Bridges Road / Williamstown MA USA 01267-2232  
Voice: 413-458-2828  
[Info@learningsites.com](mailto:Info@learningsites.com) / [www.learningsites.com](http://www.learningsites.com)

## Arch of Titus Spoils Panel Project

An extraordinary example of a mixed reality museum installation.

Donald H. Sanders, PhD, President  
Learning Sites, Inc.

In 2012, a team of historians, scientists, and archaeologists began to study the Spoils Panel of the Arch of Titus, Rome, hoping to discover and reconstruct the original colors of this remarkable work of art. The Learning Sites team was hired by the Institute for the Visualization of History, working with Yeshiva University Center for Israel Studies and Neathawk Designs, re-create a rare historical depiction as it might have once looked.

The Arch of Titus is located at western end of the Via Sacra (the Sacred Way and main processional street) in the Forum in Rome. The arch was built around 81 CE during the reign of Emperor Domitian to celebrate the triumph of his brother, then general, Titus (he ruled as Emperor Titus from 79-81 CE) in the Jewish War of 66–74 CE (chronicled by ancient Jewish-Roman historian Flavius Josephus in his writings called *The Jewish War*). The Spoils Panel depicts a line of Roman soldiers, some carrying placards (that once held explanatory text), parading key objects taken from (one presumes) the Temple in Jerusalem after their victory over the Jews. Among the objects the relief displays are the Temple menorah, the table of the showbread, trumpets, and sacred cups.

In 2012, a multidisciplinary team of historians, scientists, and archaeologists began using ultraviolet visual absorption spectrometry (a technique that uses white light and a spectrometer to measure the wavelengths of the reflected light from a surface) to investigate crevices in the relief. The measurements taken from the menorah corresponded to yellow ochre, confirming for the first time that the color of the menorah on the relief was meant to evoke the gold of the original taken from Jerusalem. Using ancient literary sources, evidence from Roman wall paintings, traces of color detected on other Roman sculptures, archaeological evidence, and scholarly intuition, colors could be defined for most of the other features of the panel, as well.

This was just the beginning. For an exhibition on the arch at the Yeshiva University Museum (NYC), we were called upon to create a unique display as the centerpiece of the exhibit. We collaborated with Neathawk Designs (Williamstown MA, USA) who milled an exact full-scale replica of the spoils panel using their CNC (Computer Numerical Control) machine. The replica was carved out of high-density urethane foam and then painted to

match the look of the currently preserved relief in Rome. While that was being created, our modelers, under the direction of Steven Fine (Yeshiva University, NYC) and Peter Schertz (Virginia Museum of Fine Arts, VA, USA) digitally restored all the missing objects, people, and clothing of the relief. That digital replica was then colorized using evidence we had accumulated earlier in the project.

The full-scale replica was installed in the museum. To the delight of everyone watching, we then project onto the replica surface our fully digitally restored and colorized image of what the relief may originally have looked like, providing visitors to the museum with a heretofore unimagined glimpse into the past and an image of the relief unseen for 2000 years. Currently, the digital projection cycles through showing the relief as it currently exists, then projects onto that after a time the full digital restoration, then after a moment the color is displayed. The entire sequence brings to life **once again one of history's great** artwork.

For some supplemental online background material see:

[http://www.learningsites.com/Rome/Titus\\_home.php](http://www.learningsites.com/Rome/Titus_home.php)

<http://www.yumuseum.org/exhibitions/upcoming/the-arch-of-titus-from-jerusalem-to-rome-and-back>

<https://www.youtube.com/watch?v=R4OuHXbofwA&t=1s>

[http://www.iberkshires.com/story/55448/Williamstown-Artist-Creates-Replica-of-Roman-Sculpture-Panel.html?source=most\\_read](http://www.iberkshires.com/story/55448/Williamstown-Artist-Creates-Replica-of-Roman-Sculpture-Panel.html?source=most_read)

Supplemental research resources:

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2017 "True Colors: digital reconstruction restores original brilliance to the Arch of Titus," Biblical Archaeology Review 43.3:28-35, 60-61.

Holzinger, H.  
1901 "Der Schaubrottisch des Titusbogen," Zeitschrift fuer die alttestamentliche Wissenschaft 21.2:341-42

Ny Carlsberg Glyptotek

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2010 "Colori dell'Ara Pacis: storia di un esperimento," *Archeomatica* 1.3:20-25.

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1991 The Spoils of Jerusalem on the Arch of Titus: a re-investigation. *Skrifter utgivna av Svenska institutet i Rom*. 8. Uppsala: Astrom.













