
RSNA Press Release

Radiologists Help Provide Worldwide Access to Ancient Art

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Media Contacts:

Maureen Morley Heather Babiar
(630) 590-7754 (630) 590-7738
mmorley@rsna.org hbabiar@rsna.org

CHICAGO - Using computed tomography (CT) and 3-D modeling, radiologists are assisting in the restoration and display of a 5,300-year-old Egyptian mummy mask. This is the first time that CT and 3-D modeling were used to study, preserve and display an antiquity with an outer and inner surface, according to research presented today at the annual meeting of the Radiological Society of North America (RSNA).

"Previously, radiologists have focused on the mummy itself," said Douglas D. Robertson, M.D., Ph.D., associate professor of radiology and director of the musculoskeletal imaging and biomechanics lab at the University of Pittsburgh. "With this project, we focused on the mask as a work of art. We hoped not only to conserve the mask, but also to create a virtual reality replica that would allow worldwide access via the Internet."

The mask, owned by the Saint Louis Art Museum in Missouri, is from the mummy of an Egyptian noblewoman and is constructed of gauze, bitumen, gold, glass, wood and paint. It depicts the image of a woman's face and upper body. Her arms appear to be folded, and she holds two amulets.

Dr. Robertson and his team performed volumetric CT imaging on the mask. The researchers were able to identify previously unknown aspects of the mask's composition, including the number of wood pieces used to create the amulets. In addition, texture mapping revealed that surfaces, such as the bead details, previously thought to be flat were actually embossed.

More importantly, the CT images allowed the researchers to locate internal and external damage not visible to the naked eye. Using rapid prototyping software, the researchers then compiled the CT images into a 3-D replica of the mask, which was used to assist in the repairs.

The 3-D computer model of the mask allows viewing from any angle, including an inside

At A Glance

- For the first time, radiologists have used computed tomography (CT) together with 3-D modeling to analyze, conserve and display an antiquity with an outer and inner surface.
- Using CT, researchers identified areas needing repair on a 5,300-year-old Egyptian mummy mask.
- The 3-D model created from CT images allows viewing of the mask from any angle—including an inside view.

view-impossible with traditional museum displays. It also allows global access to the mask, because the museum could provide the virtual reality version on its Web site.

"The museum was very excited about using radiology scans to re-create items, and the possibility of using this as a new form of art conservation," Dr. Robertson said.

Co-authors of the study are William Gene Totty, M.D., Gulshan B. Sharma, M.S., Sidney Goldstein, Ph.D., Kirk Smith and Suzanne Hargrove.

Abstract:

• [New Roles for Radiologic Imaging in Art: Application to Egyptian Mummy Mask](#)

Images (.JPG format)

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

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RSNA is an association of more than 37,000 radiologists, radiation oncologists and related scientists committed to promoting excellence in radiology through education and by fostering research, with the ultimate goal of improving patient care. The Society is based in Oak Brook, Ill.