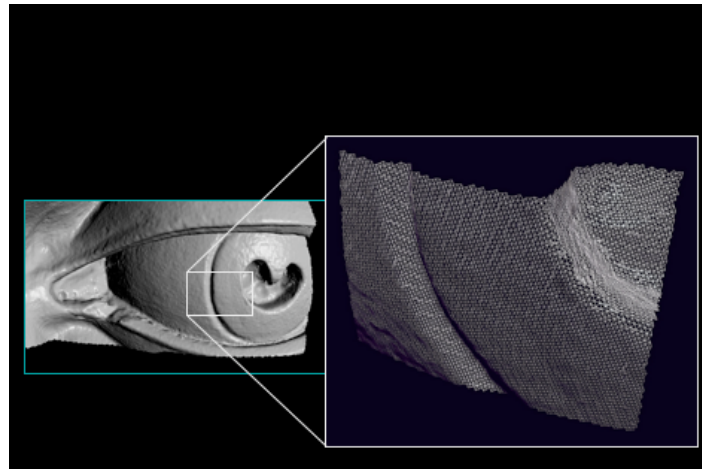


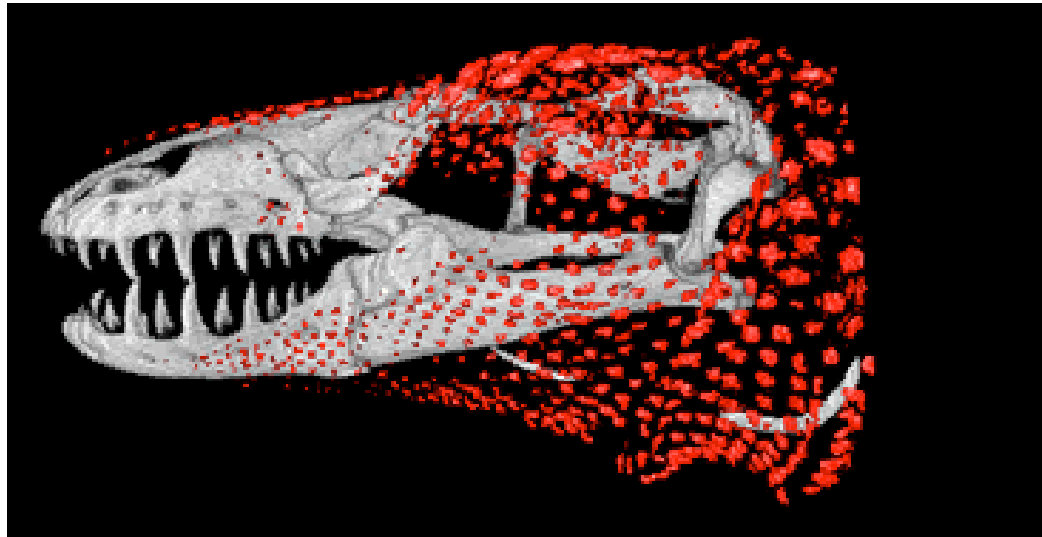
Digital Representation of Cultural Heritage Material

- new possibilities for enhanced access -



Stephen M. Griffin
Program Director
National Science Foundation (USA)

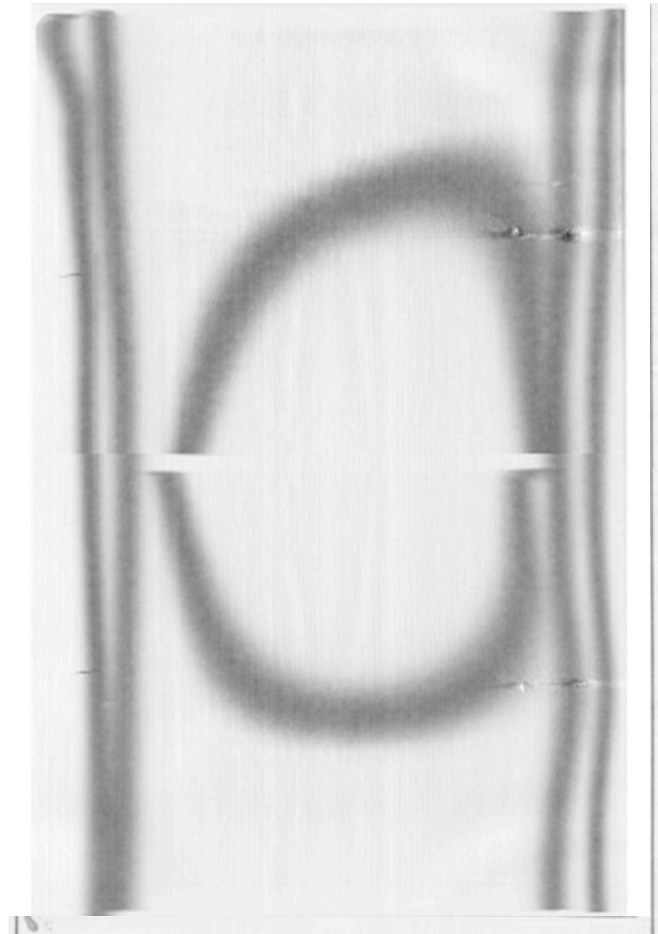
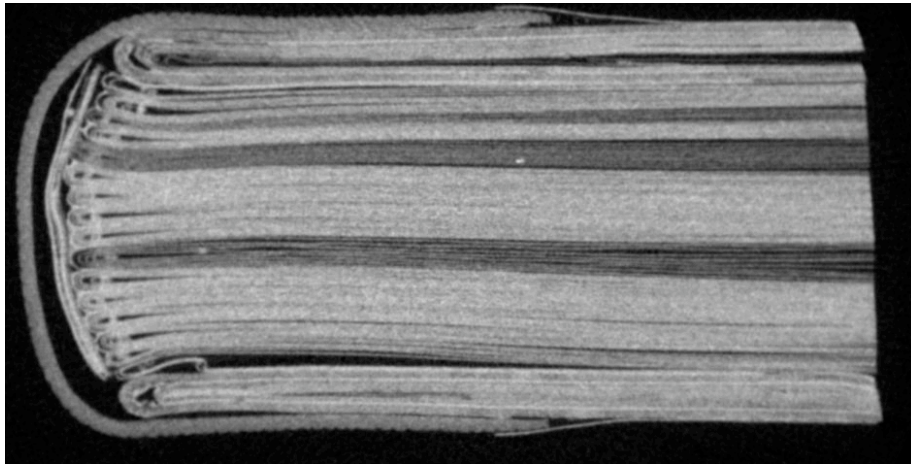
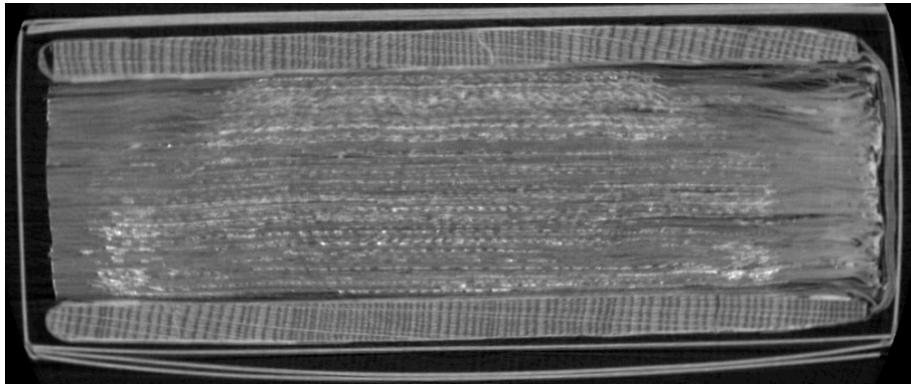
A Digital Library of Vertebrate Morphology Using High-Resolution X-ray CT



www.DigiMorph.org

High Resolution X-ray CT

16th-century Mexican Psalterium



EDUCE: Enhanced Digital Unwrapping for Conservation and Exploration

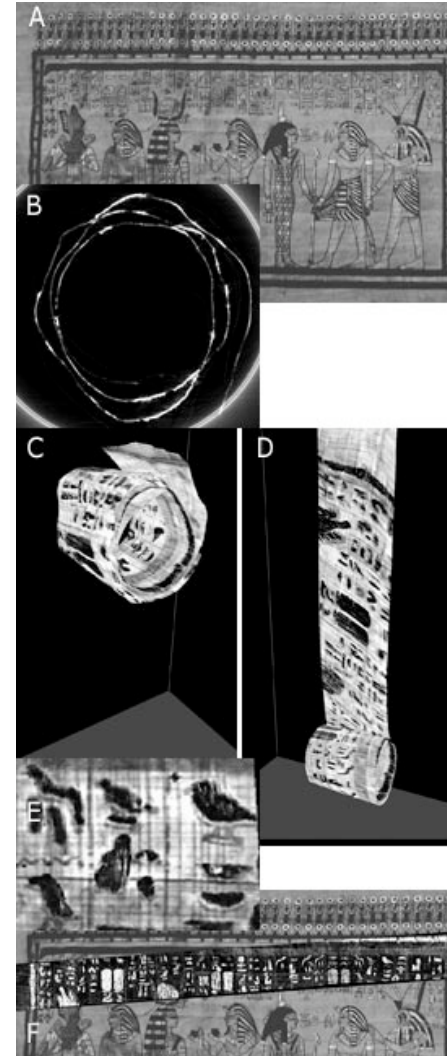
A: photo of a replica Egyptian papyrus scroll

B: CT slice from Gray's scanner shows the flare-up of ink (the white regions).

C: software puts the CT slices together, “unrolling the virtual scroll”

D: detail of “unrolled” virtual scroll

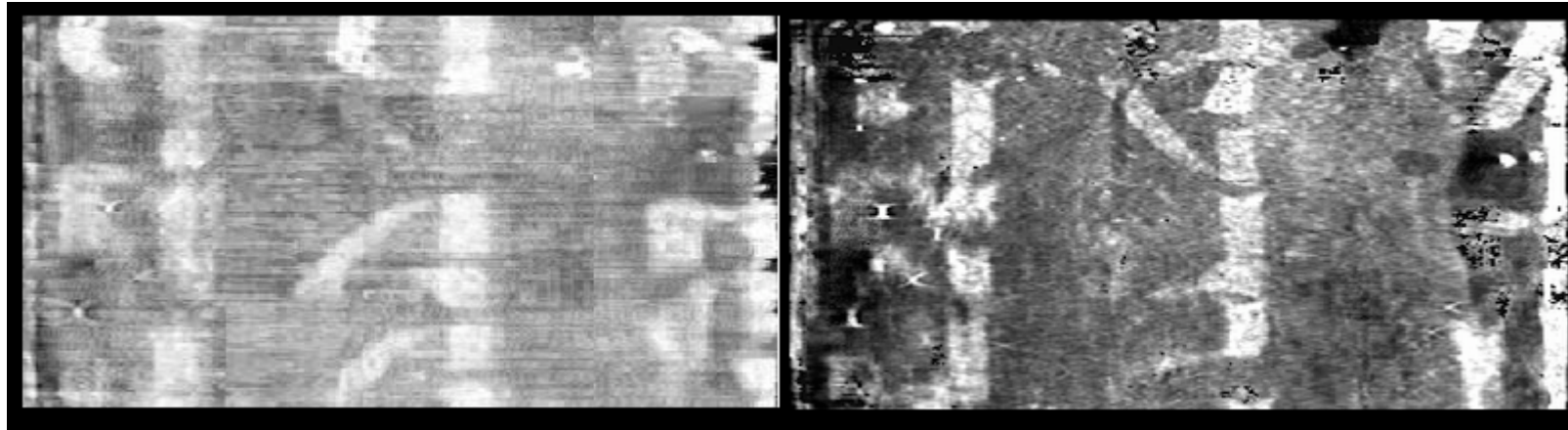
F: Virtual scroll strip inset over the photo of the original scroll.



<http://dmn.netlab.uky.edu/~seales/educ/>

Hebrew Manuscript of Ecclesiastes

Recovering Hidden Text



Reading between the lines: Imaging the Lost Writings of Archimedes



Keith T. Knox, Boeing

<http://www.archimedespalimpsest.org/>

Edition Production Technology (EPT)

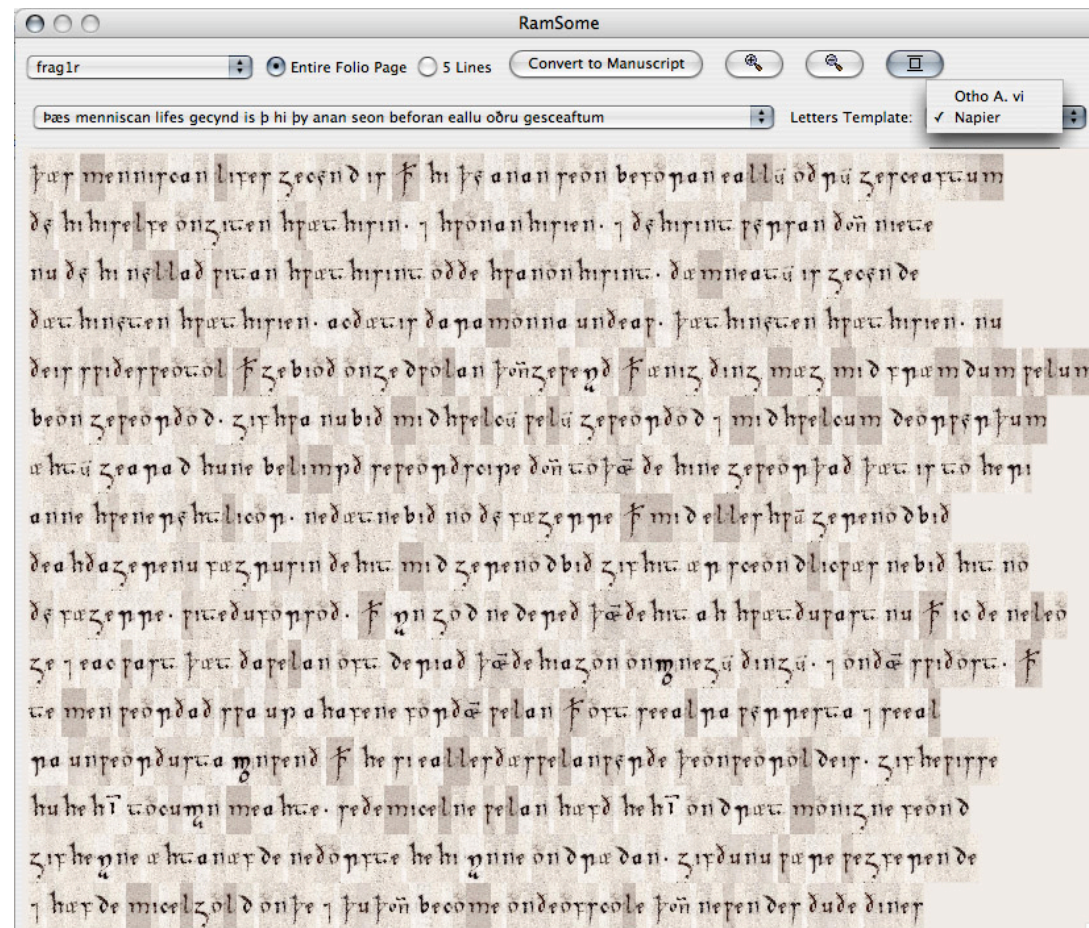
Analytical tools created as part of a comprehensive "edition production technology" (EPT) for image-based electronic editions can help editors reconstruct folios from lost or damaged manuscripts. A case in point is the Napier fragment of the Alfredian Boethius, the bottom portion of a MS leaf found and lost by A. S. Napier in 1886. Assembling and displaying Napier's detailed descriptions, digital tools can not only recreate a plausible reconstruction of the lost leaf, but also throw legitimate doubt on its authenticity.



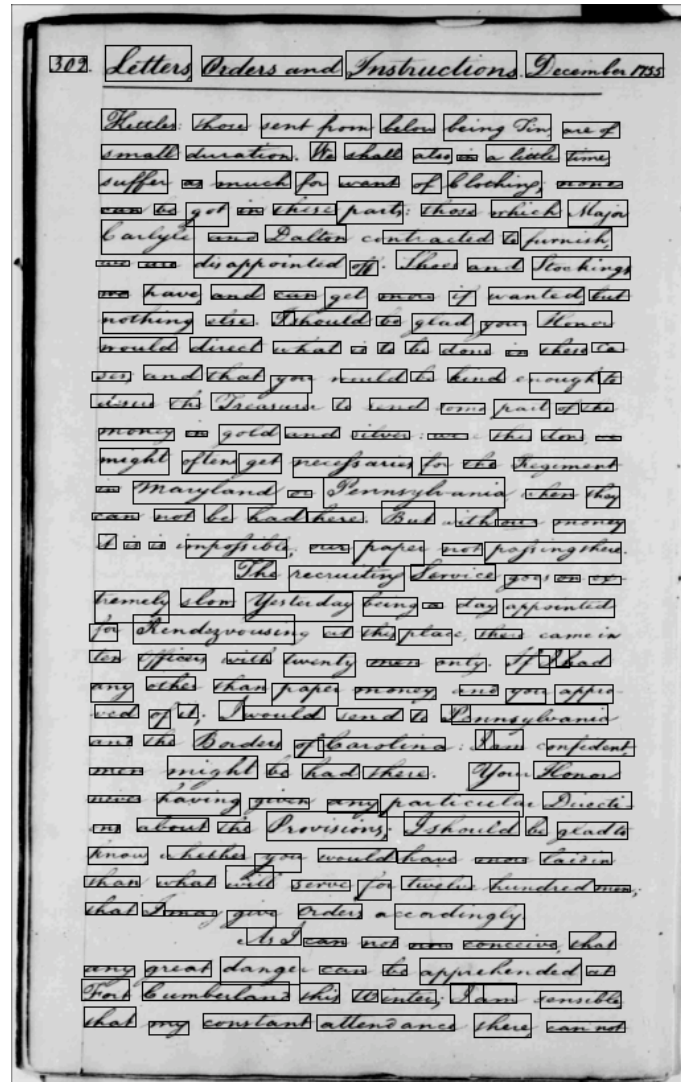
Figure 10: Detail from RamSome reconstruction of Napier fragment

Edition Production Technology

-individual letter recognition-

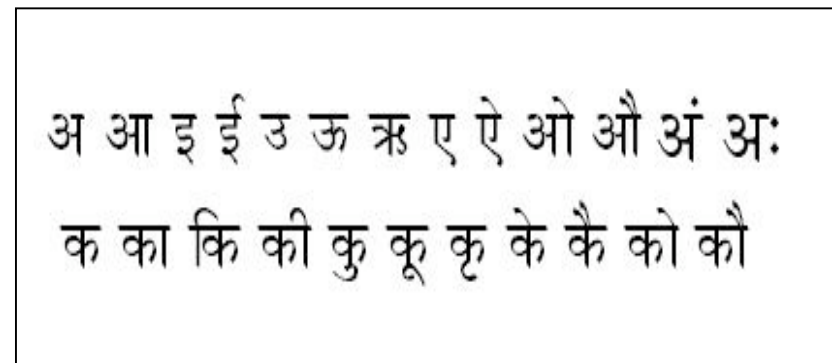
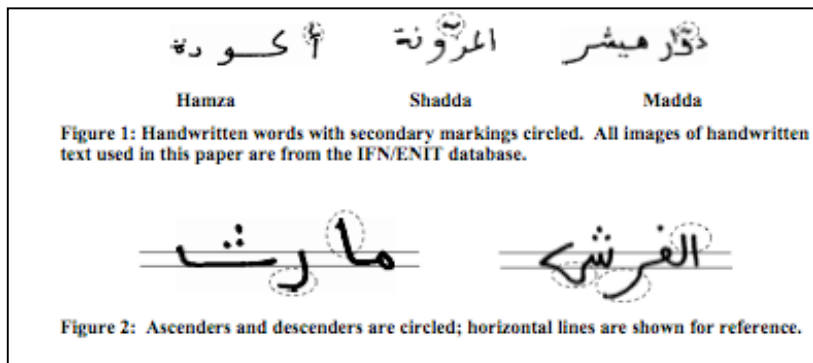


Word Spotting: Indexing Handwritten Manuscripts



Example Manuscript and Segmentation

OCR of non Roman Scripts



Arabic, Devanagari

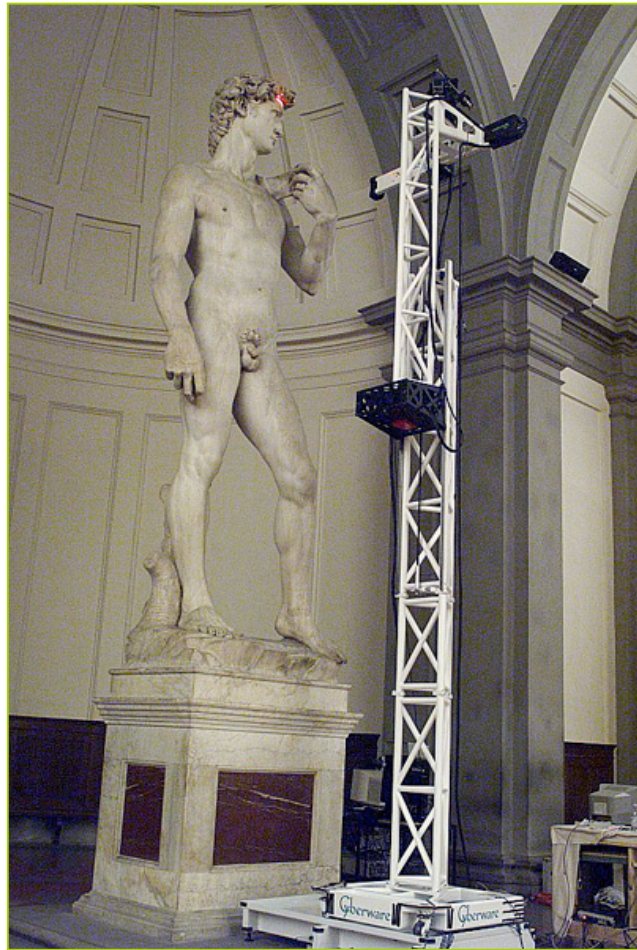
Center of Excellence in Document Analysis and Recognition (CEDAR)
SUNY, Buffalo

<http://www.cedar.buffalo.edu/script/Dscript.html>

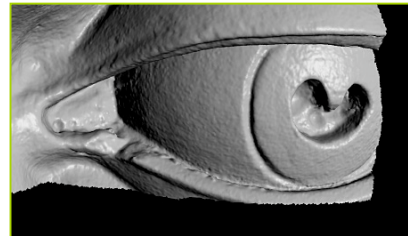
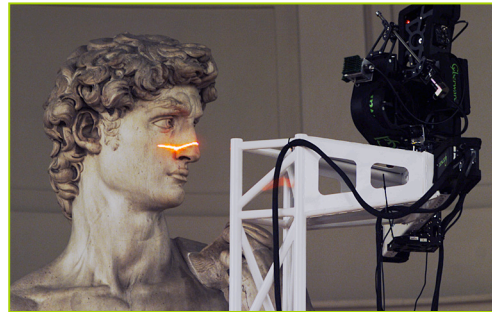
Large Data Objects

Michelangelo's David

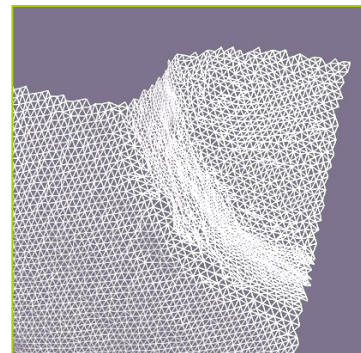
Laser scanning, digitization and computational rendering of Michelangelo's David



By Professor Marc Levoy of Stanford University

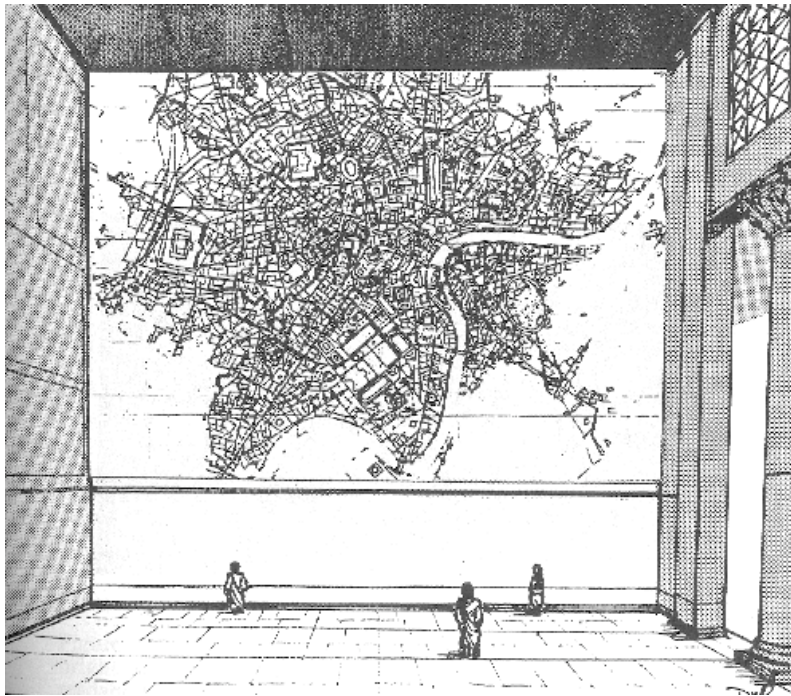


David's left eye



The scanning gantry is 7.5 meters high. 480 individually aimed scans were performed. The resulting 3D raw data set exceeds 250GB. The digital model, accurate to .25mm, contains 2 billion polygons and 7 thousand color images.

Reconstruction of Large and Incomplete Artifacts: Forma Urbis Romae



David West Reynolds

Forma Urbis: Now

- ~1,200 marble fragments (250 identified, 400 non-incised)
- Approximately 15% of total original surface area
- Fragments contain remarkable detail (all buildings, roads, staircases, etc.)
- Significant erosion has occurred, particularly along top and bottom edges

Digitization Goals



Prof. Emilio Rodriguez-Almeida

- Complete 3D archive of the extant fragments (1,100+ fragments)
- Adequate spatial sampling resolution for 3D matching and analysis (0.25 mm)
- High resolution (100 dpi) color photographs of top/bottom surfaces

Automatic Reconstruction of Ceramic Pots from 3D Dense-Data Laser Measurements of Fragments' Break Curves and Surfaces

A collection of ceramic sherds from excavations in the ancient city of Petra in Jordan.



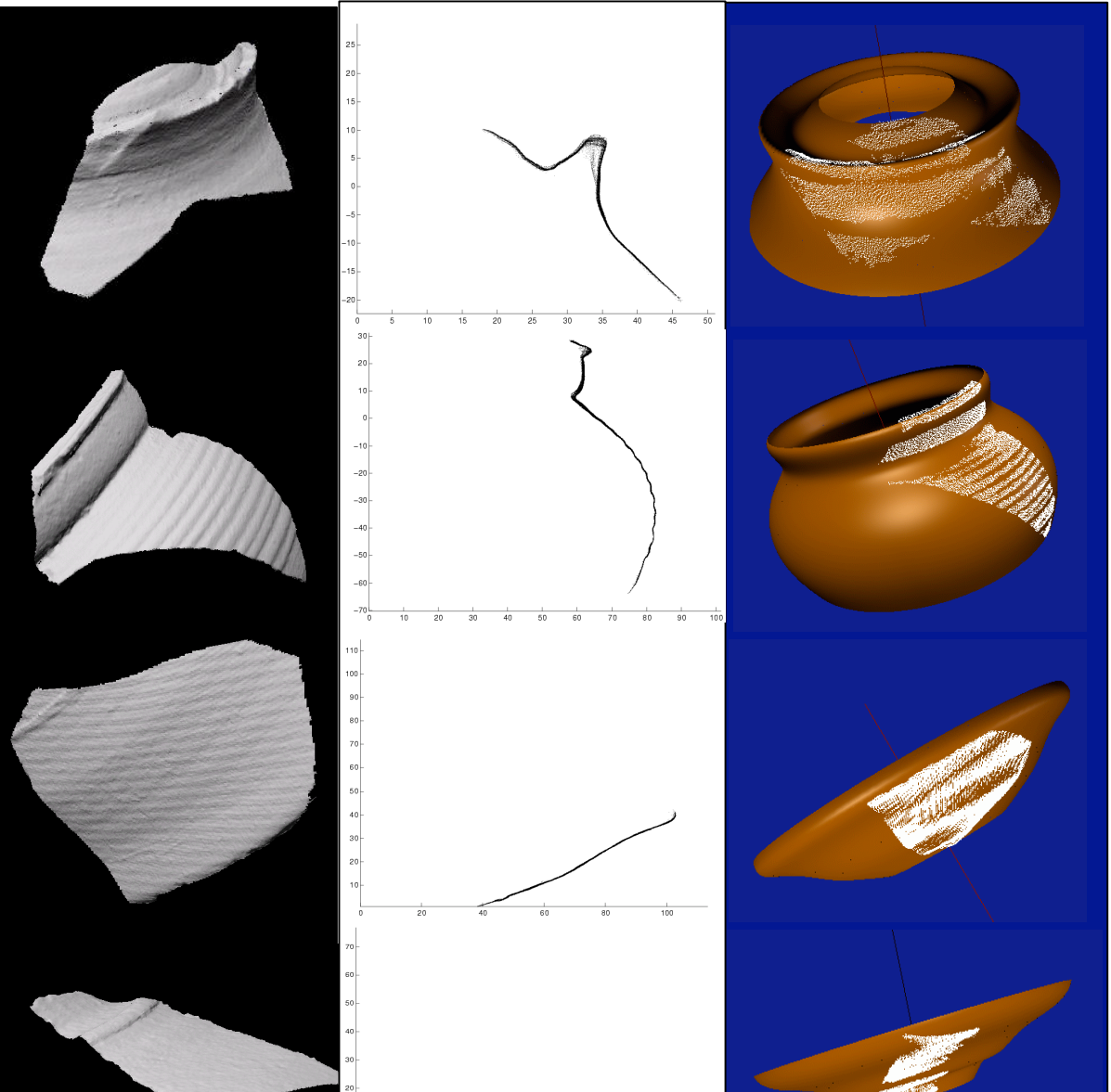
Petra



Estimated
Axis/Profile-Curves



Portions of
Reconstructed Pot
Surfaces



<http://www.lems.brown.edu/vision/>

A Correct 10 Fragment Reconstruction

The reconstruction approach is to add one fragment at a time and is search-intensive because sherds are chipped, some are missing, and data is noisy.

Fragments are matched and aligned using a probabilistic Maximum Likelihood Estimation measure

$$\max_{\text{all geometric parameters}} \mathbf{P}\{\text{all sherd data} \mid \text{geometric parameters}\}$$

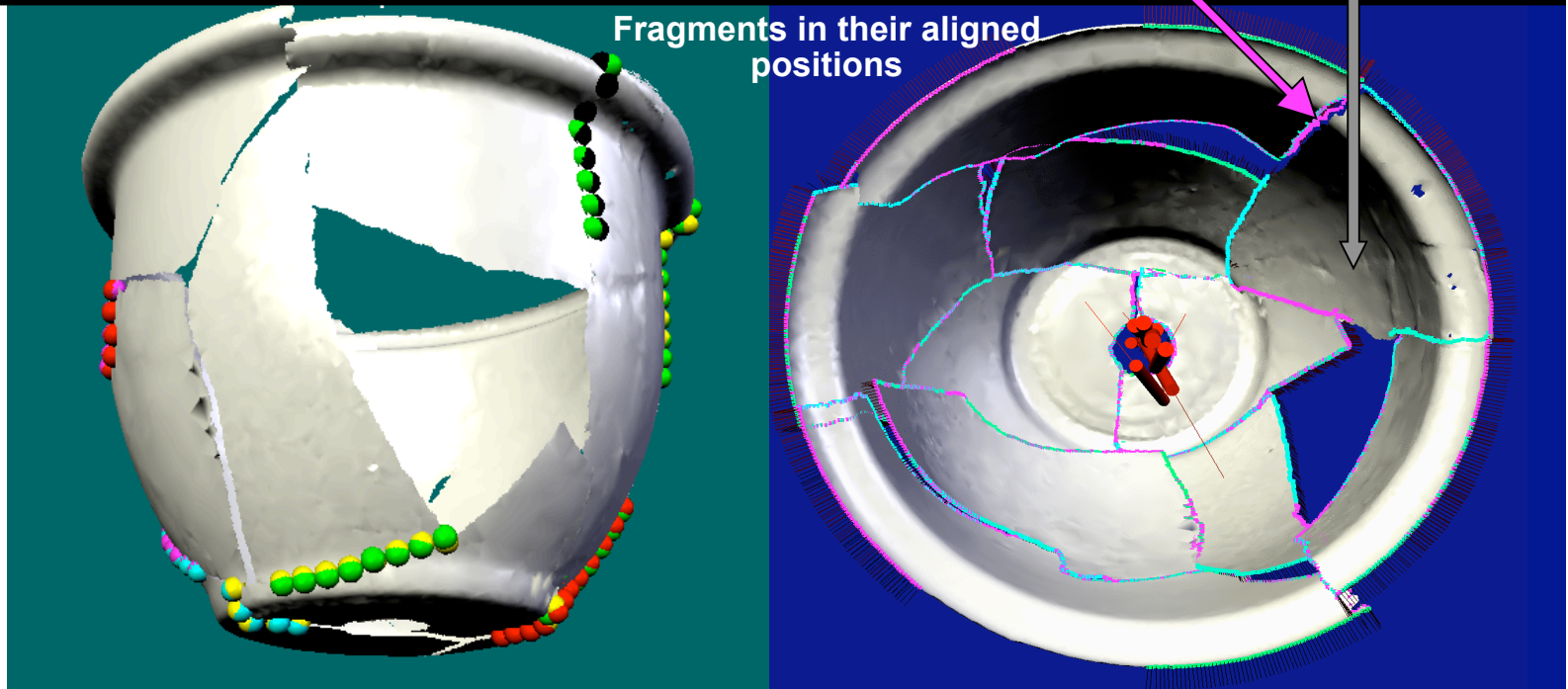
$$= \max_{\alpha, \beta, \mathbf{T}_1, \mathbf{T}_2, \dots, \mathbf{T}_I} \prod_{i=1}^I P(\text{break curve data}_i \mid \mathbf{T}_i, \beta) P(\text{surface data}_i \mid \mathbf{T}_i, \alpha)$$

- α - Axis/profile-curve for the pot
- β - Break curves for all fragments
- \mathbf{T}_i - Euclidean transformation for moving sherd i to correct position to reconstruct pot.

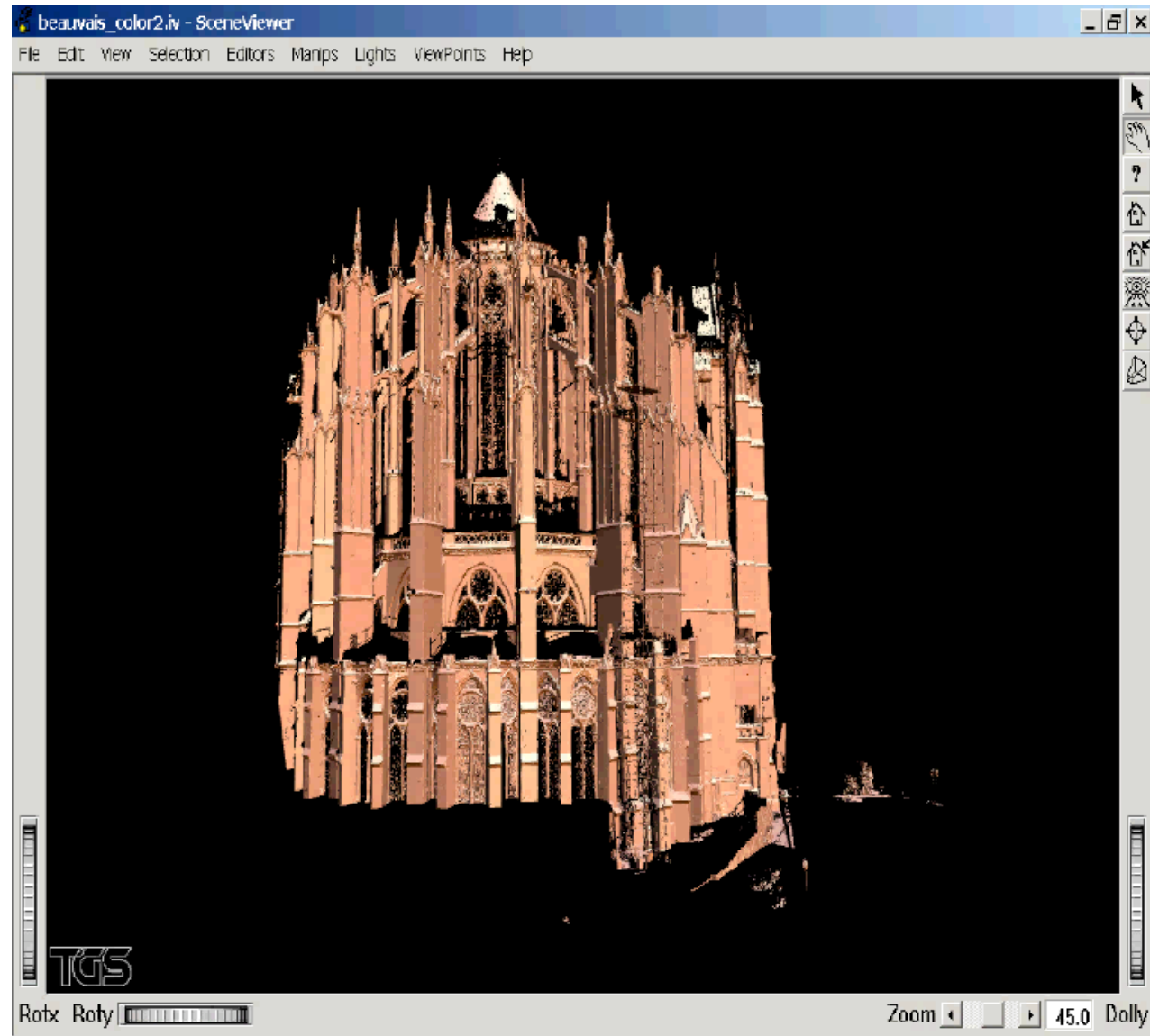
Global Pot Profile-Curve



Fragments in their aligned positions



Modeling, Visualizing and Analyzing Historic and Archaeological Sites

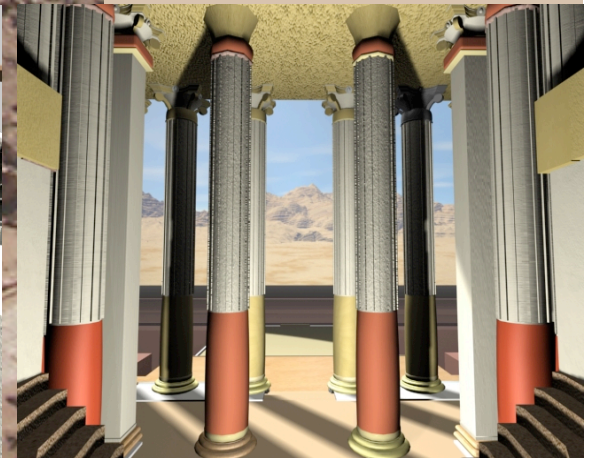
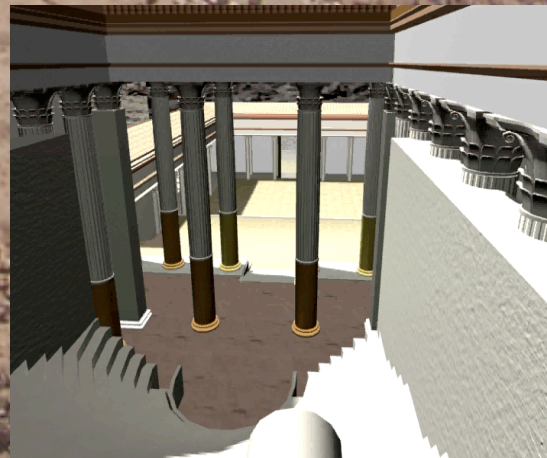


Virtual Reconstruction of Archaeological Sites e.g., The Great Temple in Petra, Jordan

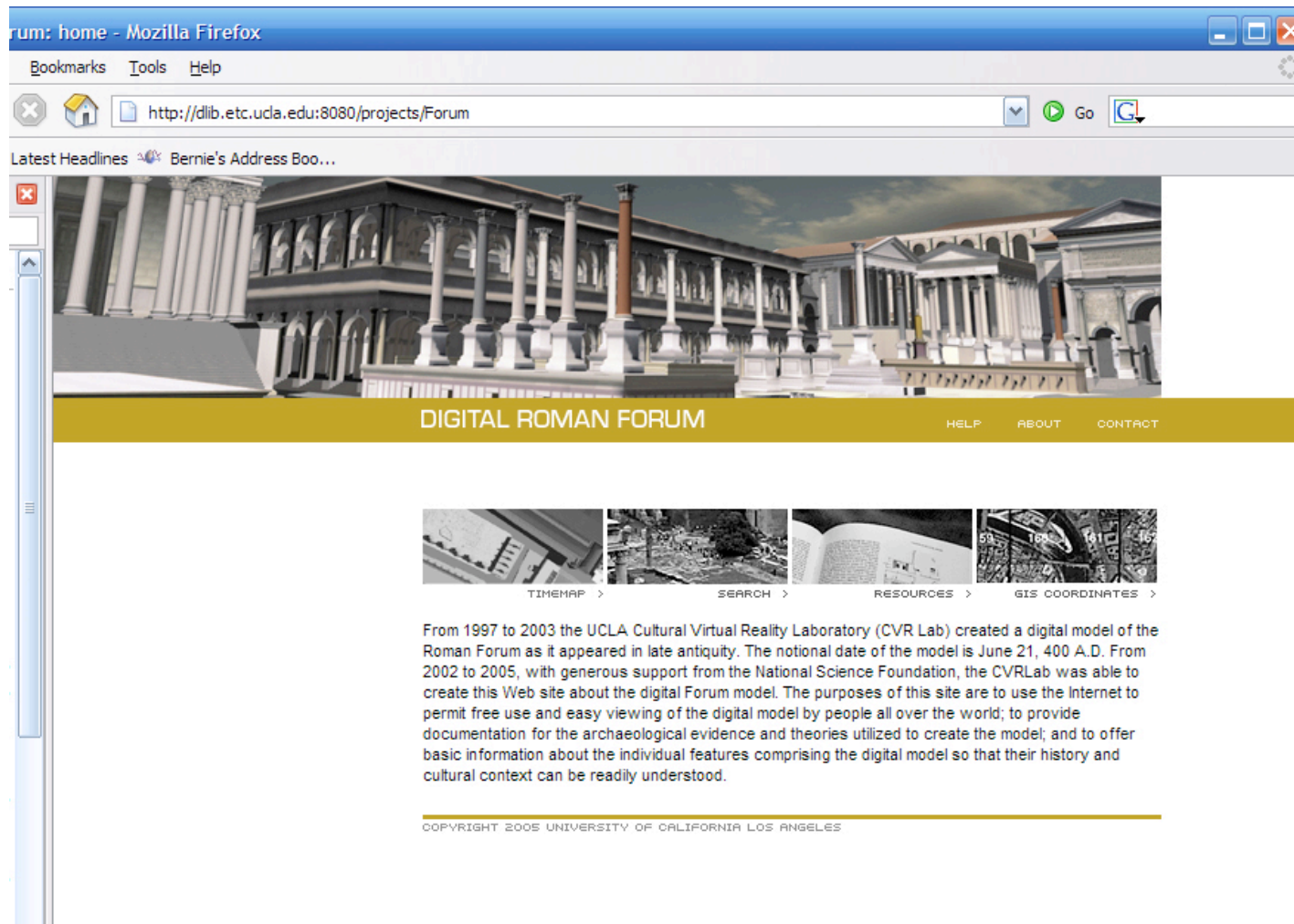


- Excavations 1993-present
- Over 70 Trenches Excavated
- Database with close to 500,000 Finds

Shown are reconstructed temple:
outside views, and a 3D VR Brown-
CAVE interior view.

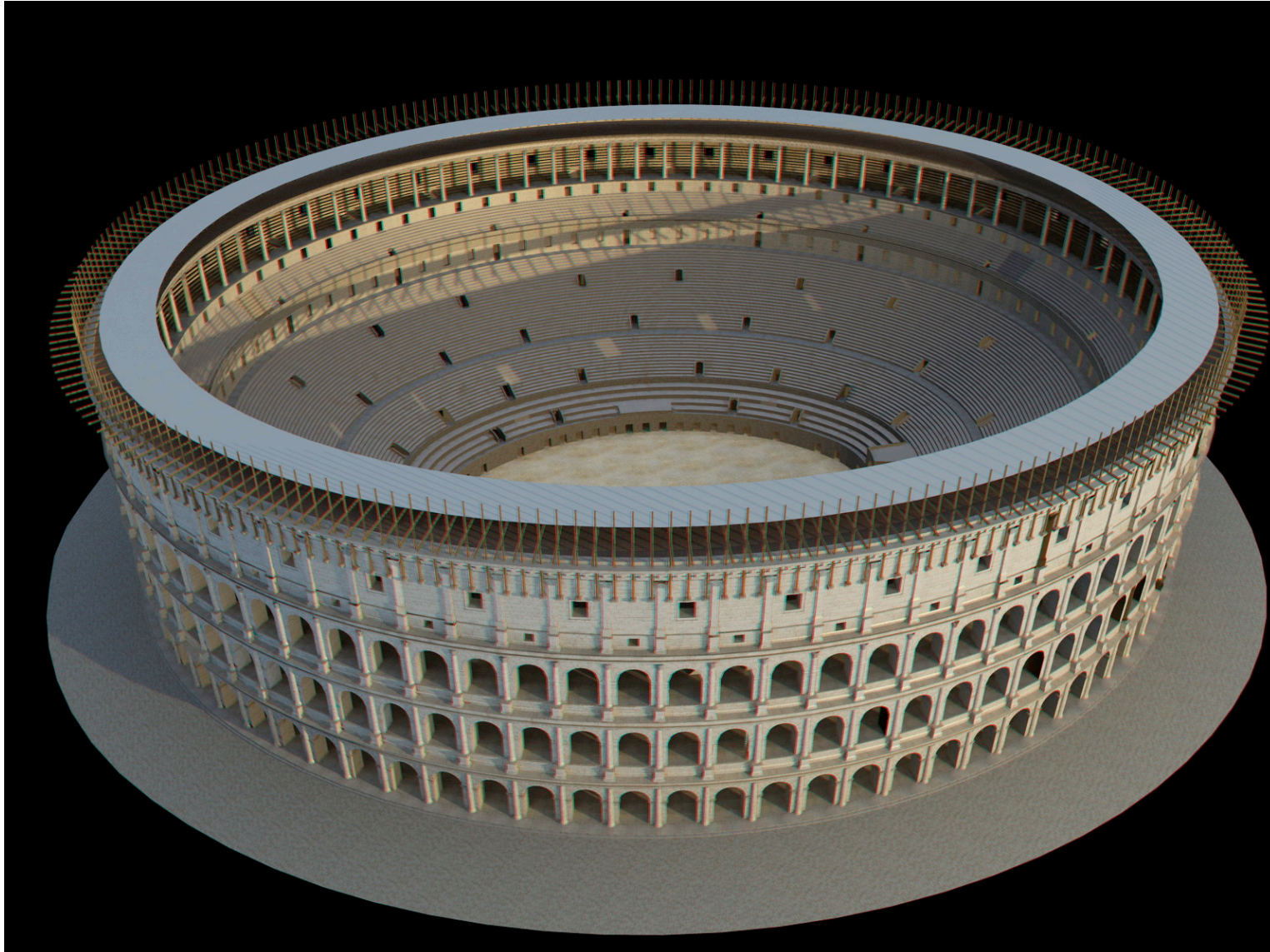


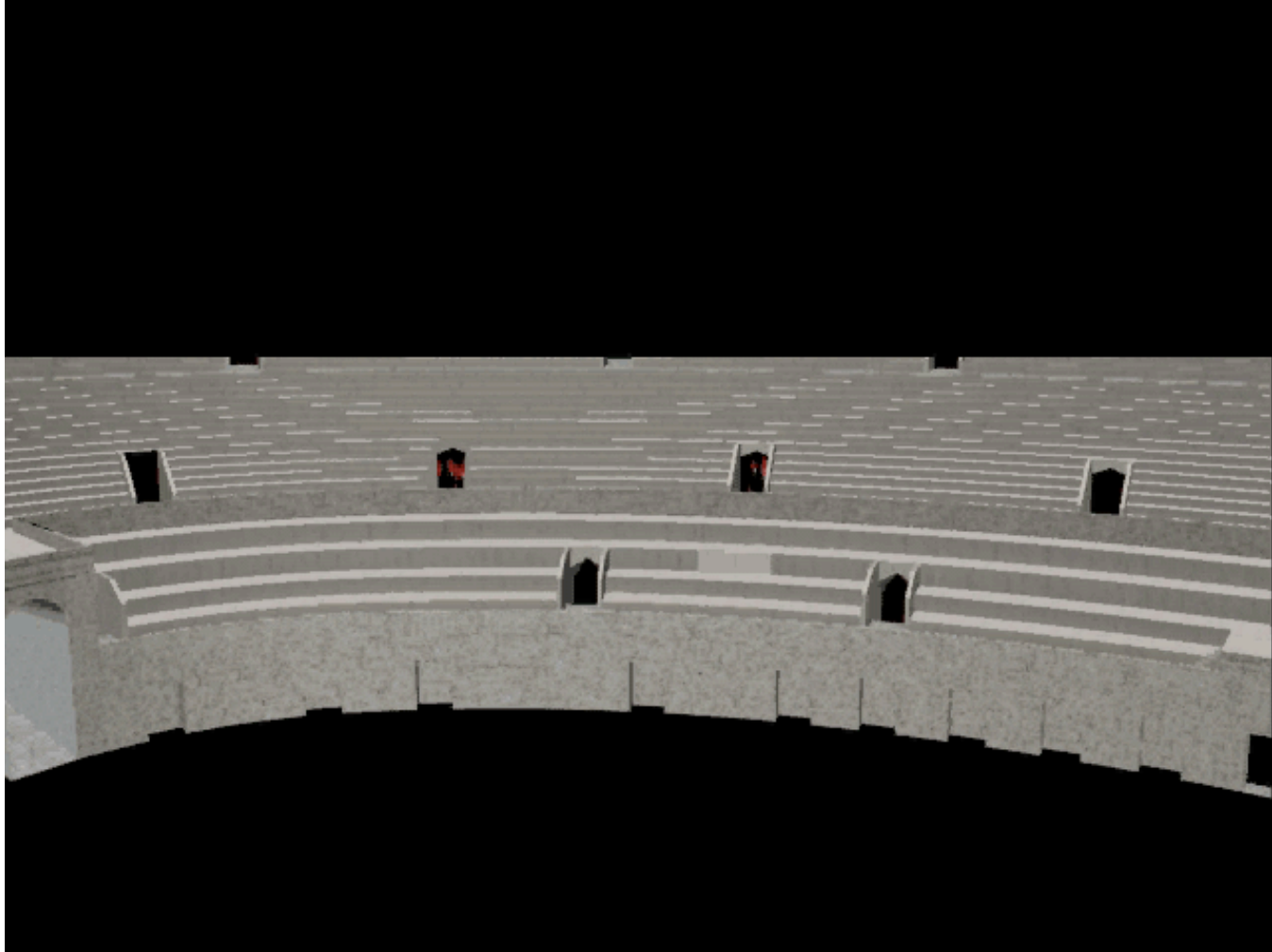
Digital Archaeology



<http://dlib.etc.ucla.edu/8080/projects/Forum>

Bernie Frischer AIHT, University of Virginia





The Perseus Project: A Digital Library in the Humanities

Gregory Crane
Tufts University

Analytical 3D



Images:

Small (600x179)

[Medium \(3348x1002\)](#)

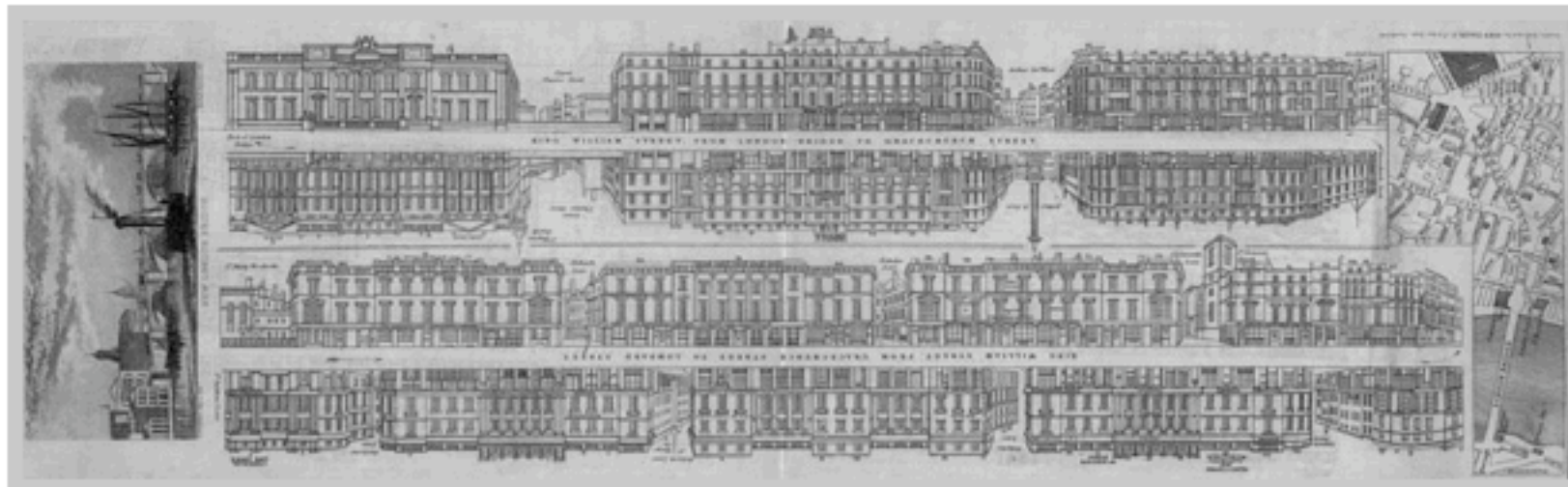
[Large \(6696x2004\)](#)

King William Street

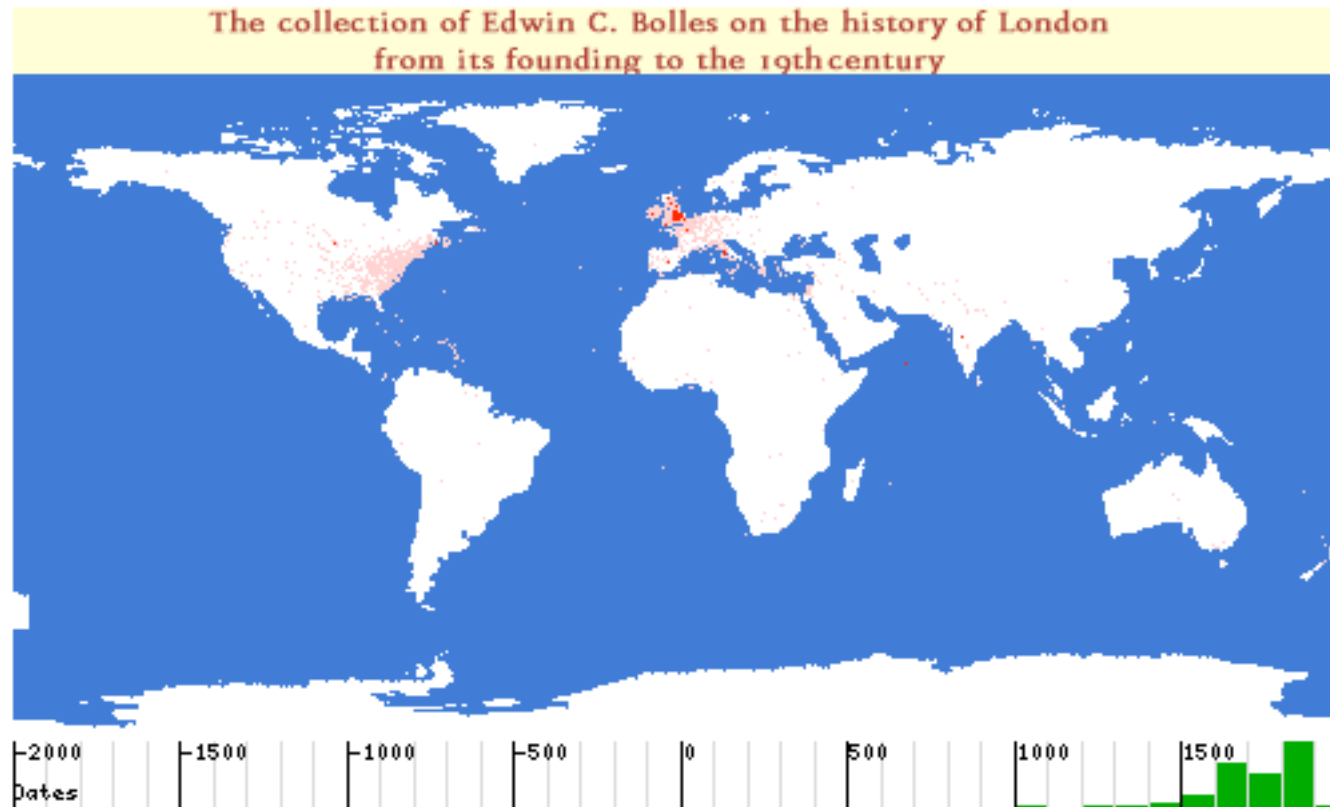
Courtesy Tufts University Archives

[Copyright notice.](#) [About image tiling.](#)

Illustration of [King William Street](#) ([Browse more pictures of same](#)); [London](#) ([Browse more pictures of same](#))

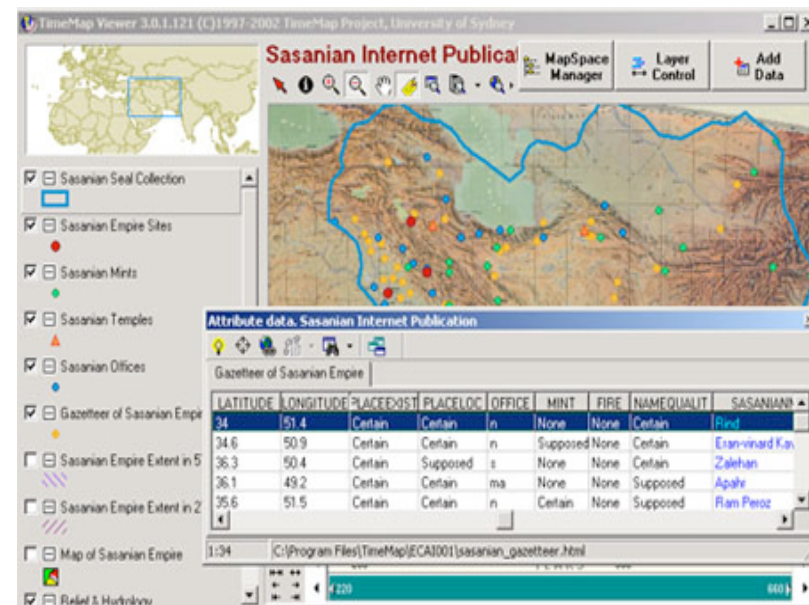


Time & Space





Electronic Cultural Atlas Initiative



Time-enabled GIS viewing for historical and cultural gazetteer data.

www.ecai.org

WHEN, WHERE and WHO. Catalog records found from a time period search commonly include names of persons, places, events important at that time. Their names can be forwarded to, e.g., biographies in the Wikipedia encyclopedia.

Subjects:

Robert -- I, -- King of Scots, -- 1274-1329.

Subjects:

Scotland -- History -- War of Independence, 1285-1371.

Other Authors:

John.

LC Call Number:

DA783.41 .L4 1969

Dewey Call Number:

941.103

Attempt to Search for Robert_I in Wikipedia

Robert I of Scotland

From Wikipedia, the free encyclopedia.

Robert I, (**Robert de Brus** in Norman French and **Roibert a Briuis** in medieval Gaelic), usually known in modern English today as **Robert the Bruce** ([July 11, 1274](#) – [June 7, 1329](#)), was King of [Scotland](#) ([1306](#) – [1329](#)). He was one of Scotland's greatest kings, and one of the most famous warriors of his generation, leading Scotland during the [Wars of Scottish Independence](#) against England. He claimed the Scottish throne as a great-great-great-great grandson of [David I of Scotland](#).

cdli

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A joint project of the
University of California at Los Angeles *and the*
Max Planck Institute for the History of Science

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(NSF/NEH) and the [Max Planck Society](#)

Berlin Mirror

Lead page of the CDLI

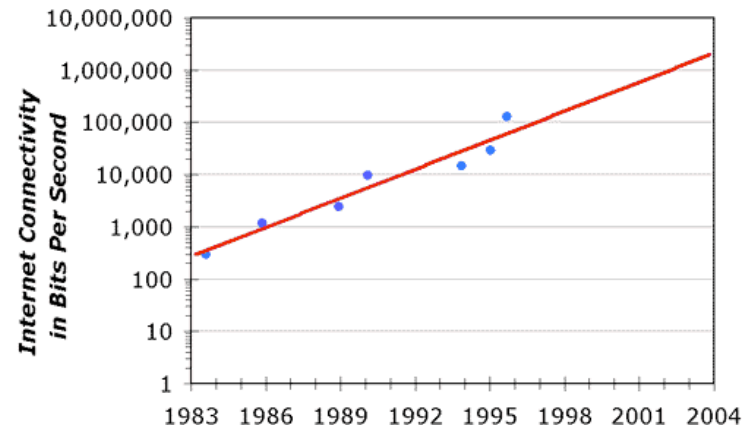




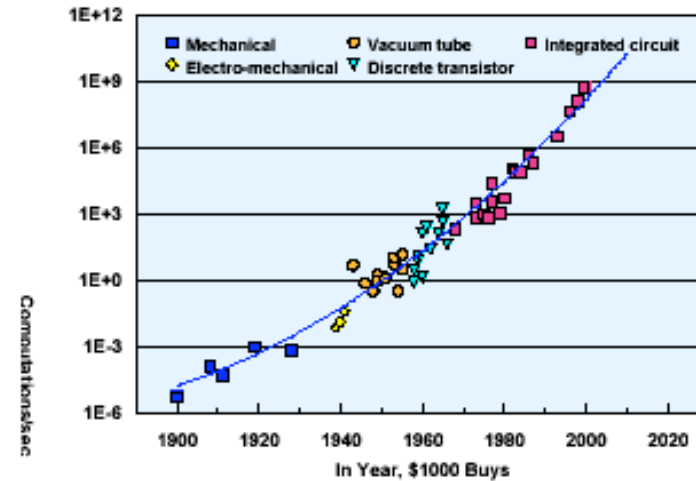
<input type="checkbox"/> <input type="button" value="Compare"/>		Item Title	PayPal	Price
<input type="checkbox"/>		<u>SUPERB!!! Ancient Babylonian cuneiform tablet, 2200 BC</u> Authentic artifact from ancient Babylon! NO RESERVE		\$111.60
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<input type="checkbox"/>		<u>OLD BABYLONIAN CLAY TABLET CUNEIFORM INSCRIPTION #2</u>		\$179.00

Exponential Changes in Core Technologies

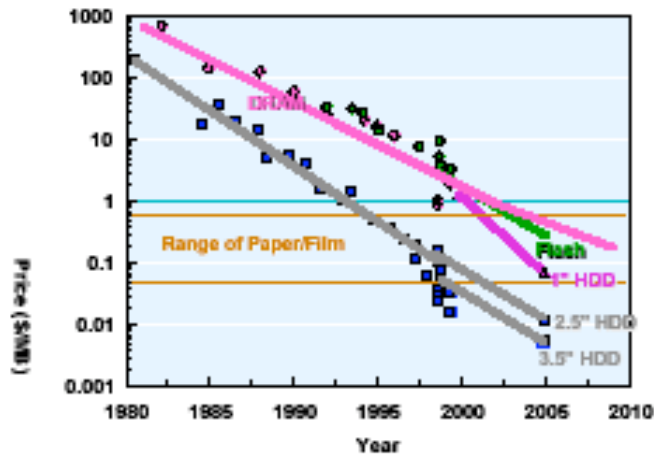
Internet Connectivity (Bits per Second)



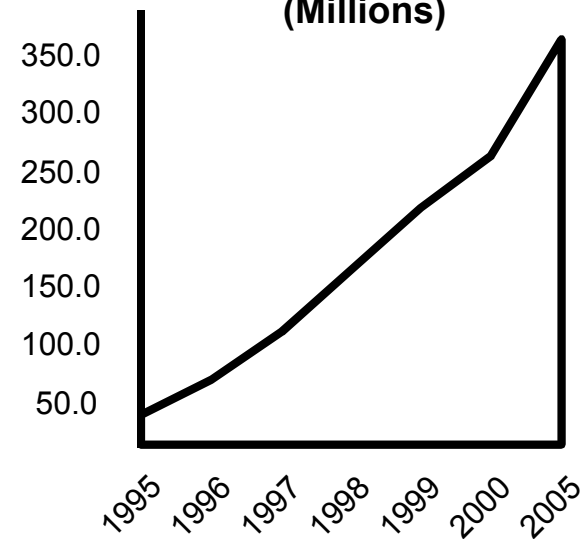
Average Price of Cycles



Average Price of Storage



People on the Internet (Millions)





The Great Wave at Kanagawa/Katsushika Hokusai (1760-1849)
Modified ~1982