The Jubilees Palimpsest Project

Todd Hanneken
St. Mary’s University
thanneken@stmarytx.edu
http://jubilees.stmarytx.edu
http://twitter.com/thanneken

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- News (LINK)
- A comprehensive open repository of advanced images of the Jubilees Palimpsest, followed by other palimpsests in the Biblioteca Ambrosiana (LINK)
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- Reconstruction of the Jubilees Palimpsest (LINK)
- Publications and translations of resources on the Jubilees Palimpsest (LINK)
- Spectral RTI technology (LINK)
- Extended Spectrum color processing (LINK)
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Overview of Project Goals
- A permanent center for digital archaeology (LINK)
- Advance and promote the tools of discovery (LINK)
- Create educational opportunities for the next generation of digital archaeologists and digital humanists (LINK)
- Create scholarly forums for scholarship on digital archaeology (LINK)
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Resources and Links
THREE BIG QUESTIONS AND THREE PRIORITIES FOR DIGITAL ARCHAEOLOGY

- How primary are your primary sources?
  - Access
- Is there a substitute for first-hand experience?
  - Texture and interactivity
- Do you have all the primary sources?
  - Discovery by expanding human perception
How Primary are your Primary Sources?
**First Priority for Digital Archaeology: Access**

- Digital repositories
- Open license, open access
- User interface
- Interoperable standards
- Interactive critical editions
- Big data processing across repositories

**Open Image Repository**

Although the Jubilees Palimpsest provided the original impetus for the Jubilees Palimpsest Project, it subsequently became clear that the tools of digital archaeology could have a far greater impact if applied systematically to the tens of thousands of unreadable manuscripts already in libraries and museums. The following palimpsests at the Biblioteca Ambrosiana, particularly those acquired from the Bobbio, have been identified as the top priority for advanced imaging.

**Early Judaism and Christianity**

1. Latin Jubilees (80 pages, LDAB 7663), captured 2017, basic images published, advanced images in progress.
4. Ascension of Isaiah (58 pages, LDAB 7376)
5. Gothic Commentary on the Gospel of John / Skeireins (16 pages, LDAB 10984)
7. Juvenecus, Evangeliorum Libri Quattuor (148 pages, E 57 Sup)

**Biblical Literature**

8. Origen, Hexapla (112 pages, O 39 Sup.), five sample folios (ten pages) captured, processed and published 2017
9. Synoptic Gospels Fragments Palimpsest (32 pages, Q 6 Sup.)
10. Ulfila, Gothic Translation of the Book of Nehemiah (6 pages, LDAB 108086)
11. Ulfila, Gothic Translation of the Gospel of Matthew (4 pages, | 61 Sup.)
12. Ulfila, Gothic Translation of the Letters of Paul including a Gothic Calendar (356 [212 + 144] pages, LDAB 10684 and LDAB 10683), twenty sample pages captured 2017, processing and publication pending

**Greek and Roman Literature and Reception**

13. Bobbio Commentary on Uncertain Work by Cicero (210 pages, LDAB 7372)
14. Unidentified Palimpsest in Seventh Century Latin Script (6 pages, LDAB 7388)
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In most cases Mercati swabbed the tincture over an entire area where a letter or word might be. In some cases he drew fine lines which can be mistaken for original ink strokes. The processed images excel at making similar materials look similar and different materials look different. For example, on page 81 in the NAP02 color processing, tincture appears light blue and erased text as dark red. In the letters σσ in this image (the erased text is visible along with the reagent. However, elsewhere on the same page, where Mercati reads τιθε, the iotas appear only in light blue and not at all in dark red (the raking light images show the rule lines, so it is certain a letter was there and likely that a iota is the best fit, but any trace of the original ink has been destroyed and the visible marking in the shape of a letter iota is entirely the result of Mercati "writing" with tincture and not evidence of an original letter.)
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• Yes, if you can’t afford to travel
• Yes, if your hands are bad for the artifact’s conservation
• Yes, if the artifact is behind glass
• Yes, if the artifact is removed from its context
• Yes, if supporting tools are required for study
• Yes, if the markings you are looking for are invisible to the eye
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Second Priority for Digital Archaeology: Texture and Interactivity

- The importance of texture
- Digitization with raking light
- The importance of interactivity
- Reflectance Transformation Imaging (RTI)
- WebRTI
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Do You Have All the Primary Sources?
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Third Priority for Digital Archaeology: Discovery by Expanding Human Perception

- The importance of color resolution for the study of manuscripts
- The electromagnetic spectrum
- Human perception
- Color resolution
- Enhanced processing
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Accurate Color

Pseudocolor
THE JUBILEES PALIMPSEST PROJECT

- Expand access to the most primary of primary sources
- Replicate the experience of interacting with a manuscript as more than just a text container
- Discover new primary sources by looking beyond what has been visible to the human eye
Tools Available Now

- IIIF Repository
- IIIF Navigator
- WebRTI
- Data archive
- Free processing tools
- NEH-funded workshops

1. Latin Jubilees
2. Testament of Moses
3. Arian Commentary on Luke
4. Excerpts from
   a) Origen’s Hexapla
   b) Wulfila’s Gothic Bible,
   c) Unknown Greek Commentary on Luke
   d) Unidentified palimpsest
   e) Petrarch
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Guide to Creating Spectral RTI Images

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   c. How does the integration work? (LINK)
2. Capture hardware (LINK)
   a. Spectral imaging hardware (LINK)
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   c. Swinging arc for RTI capture (LINK)
   d. Hand-held flash for RTI capture (LINK)
3. Capture procedures (LINK)
   a. Light position capture and calibration (LINK)
   b. Hemisphere captures for RTI (LINK)
   c. Preprocessing typically done at capture (LINK)
4. Processing with the SpectralRTI_Toolkit (LINK)
   a. Software installation (LINK)
   b. Managing input data (LINK)
   c. Running for the first time (LINK)
   d. Select tasks (LINK)
   e. Adjust brightness (LINK)
   f. Static raking option (LINK)
   g. Options for Extended Spectrum (LINK)
   h. Identify region of interest (for Extended Spectrum and Pseudocolor) (LINK)
   i. Options for PCA Pseudocolor (LINK)
   j. Options for custom processes (LINK)
   k. Light position data (LINK)
   l. Additional prompts (LINK)
   m. Tips for frequent use (LINK)
5. Make the images accessible to users (LINK)
   a. RTI files (LINK)
   b. WebRTI (LINK)
   c. Tiled and layered Jpeg2000 files for IIIF (LINK)
6. Help make Spectral RTI better (LINK)
7. Glossary (LINK)
• New processing techniques
• Systematic capture in northern Italy
• Sustainability

**Laplacian eigenmap**: $m$-dimensional embedding of $X$ using the first eigenvectors of the Laplacian

$U = (\phi_1, \ldots, \phi_m)$

Belkin, Niyogi 2001
• New processing techniques
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• Sustainability
Horizon

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- Systematic capture in northern Italy
- Sustainability
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Palimpsest
The Jubilees Palimpsest Project
Pioneering the Recovery of Illegible Text from Ancient Manuscripts Through New Tools in Digital Archaeology

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