Supporting Multidisciplinary International Research through Collaborative Development

CNI 2021

Jessica Lockhart, Project Manager, UofT
Rachel Di Cresce, Project Librarian, UTL
The ‘Global Turn’ in Medieval Studies
The Book and the Silk Roads

New approaches to the global history of the book
Our research mission in BSR: Phase 1

Each research cluster will adopt a case-study method and study a book or group of books directly relevant to the research cluster’s area of focus.

Through close investigations of particular, local histories of the book and bookbinding, research cluster members will contribute to BSR’s broader research findings in codicology and history along the Silk Roads.

To forge connections and initiate collaborations between and among international research groups, undertaking research with participants in five research clusters:

• Cluster I concerns the codex in Roman and South Asian contexts;
• Cluster II centers on Dunhuang bindings from the end of the first millennium CE;
• Cluster III considers the influence of Islamic bindings on European decorative binding techniques;
• Cluster IV examines fifteenth-century Ethiopian bookbinding; and
• Cluster V investigates the bindings of the earliest Hebrew printed books in Ottoman Istanbul.
Building the Network

Projects might link:

- Field Expert + Curator/Conservator
- Field Expert + BSR Digital Librarian
- BSR Medievalist + Scientist
- Conservator + Field Expert [+ BSR Medievalist] + Scientist
- Field Expert (local) + Field (international)
Current and former sewing stations

BX2080.C365, Capucin breviary, head, coronal slice 40um. Image courtesy of Andrew Nelson, Western University
Arjuna sees Krishna in his cosmic form.
Fisher MSS 01106, fol. 322.
Photo: Jessica Lockhart, 2020.
Fisher 01106 under micro-CT

Micro-CT scan conducted by Grasselli’s Geomechanics Group, Feb-March 2020. Image: James Sargan
Unopenable birchbark manuscripts in Śāradā script.

Background
Team

Digital Strategies and Technologies Co-PI:
Sian Meikle
Project Application Developer:
Shibo Liu
Imran Asghar
Senior application developer advisors:
Bilal Khalid
Andy Wagner
Technical Deliverables

1. Data management tool and workflow
2. Viewer for heterogeneous data presentation
3. Book Binding Visualization application

Created by Shocho from Noun Project
Scholarly Project Characteristics

- Unknowns
- Learning process
- Heterogeneous data
- Share and collaborate
- User experience

Walters MS. W.850, Ethiopian Gospels binding.
Guiding Principles of Development
Flexible and Iterative Development

Created by Adrien Coquet from Noun Project

Created by Shocho from Noun Project

Information Technology Services
http://its.library.utoronto.ca
Microservices

Photo from: https://medium.com/faun/exploring-microservices-5d307b344d0b
Graphing Database

- Structured entirely around data
- Consists of nodes and edges not tables
- Relationships are treated not as a schema structure but as data
- Define and redefine any relationships as we developed

Created by H Alberto Gongora from Noun Project
Guiding Principles of Development
Data Management

- Heterogeneous data
- Raw and processed data
- Large data sets
- Preservation
- FAIR principles
  - Findable
  - Accessible
  - Interoperable
  - Reusable
## Data Management continued...

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<th>Dataverse</th>
<th>DAMS</th>
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<td>● Micro-CT raw data sets:</td>
<td>● All data in Admin interface</td>
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Guiding Principles of Development
Open Source and Open Interoperable Standards

Created by Alexandr Cherkinsky from the Noun Project
Image, Video, Annotation

International Image Interoperability Framework (IIIF)

- Images
- Videos
- Annotation
- 2 and 3 compatible

Web Annotation

International Image Interoperability Framework, Public domain, via Wikimedia Commons
Metadata, Description, Data Model

Language of Bindings
- Descriptive terminology for bindings

Ligatus Data Model
- Binding visualization data model
Open Source Software

Admin UI
- Angular Framework
- Dgraph
- GraphQL
- tus/tusd
- Redis
- Min.io

Viewer
- Mirador Image Viewer (React)
- GraphQL
- Loris

Binding Vis.
- React
- Three.js
- WebGL
Admin and Viewer Demos
Visualizing Binding Structures
Visualization of Binding Structures


Figure 8.6. Two types of numenique single-station sewings. A: single sewing support; B: double (split) sewing support. Shown is the fold pattern [a], the spine pattern [b], and the thread movement in cross-section [c]. The arrows indicate the point where the thread enters the next quire to be sewn.

Figure 5.2. Two alternative sewing structures with two hinging loops to attach the boards. In [a], two sewing stations are used and sewing begins with anchoring the thread at the first hinging hole; [b] has four sewing stations, sewing begins at the first one and hinging loops are made while passing the second and third sewing station. The proportions are based on Kazanco cover no. 40 (Marçais and Poisson, 1948).
Binding Visualization

- Web Application to generate binding visualizations
- Alberto Campagnolo
- Ligatus Data Model
- Language of Bindings
- Integration with other infrastructure

Made using three.js
Binding Visualization
Future planning

- VisCodex integration
- Further development of Annotation capabilities
- Search and Index
- VisBind development
- Large data transfer
- Integration with ITS and library

VisCodex: https://viscodex.library.utoronto.ca/dashboard
Thank you

rachel.dicresce@utoronto.ca
jessica.lockhart@utoronto.ca