3D PRINTING
BOOK HISTORY
Extending bibliographical pedagogy through additive manufacturing

RBMS 2017
3Dhotbed.info
tiny.cc/3dhotbedrbms
WHAT IS 3DHOTBED?

HOTBED

A COLLABORATION | A PROJECT | An INVESTIGATION | An EXPERIMENT
BOOK HISTORY WORKSHOP

@kmosullivan
@3Dhotbed

https://texashistory.unt.edu/ark:/67531/metadc288089/
BOOK HISTORY WORKSHOP

2002 – Today

Instructs the full complement of skills in hand-press printing using period-accurate tools and techniques:

- Typesetting
- Papermaking
- Inkmaking
- Book Illustration
- Decorative Paper Arts
- Typecasting

More info: http://library.tamu.edu/book-history

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In order to best understand rare books and special collections materials, students should experience “all the processes through which the matter of the work before them has passed, from its being written down by the pen of its author to its appearance in the finished volume.” --Ronald B. McKerrow

3D TECHNOLOGIES & LIBRARIES
UNT DIGITAL PROJECTS LAB

The Digital Projects Lab
- 4 full time staff
- ~32 student workers

**Items digitized**
- Photographs
- Reports/Documents
- Books
- Oversized Materials
- 3D items
SMITHSONIAN X 3D PROGRAM

2013: Digitization Program Office at the Smithsonian

19* models available for the public to explore/print

*of a total 137 million artifacts

Lincoln Life Mask: https://legacy.3d.si.edu/explorer?modelid=26
GREEN LIGHT TO GREATNESS

FALL 2015 | $3750 Grant | 3D scanner, supplies and accessories acquired
NEXT ENGINE HD 3D SCANNER
MODEL SCANNING AND PROCESSING SOFTWARE

ScanStudio

Meshlab
UPLOAD PACKAGING

[Object-name]
PNGs
GIF
Models
  Original STL
  Edited STL
  Textured OBJ
README.txt
Metadata.xml
DATA ADDED TO THE DIGITAL LIBRARY

Den geest des gebeds vol godvrugtige oeffeningen, uyt de H. Schrifture, den missael en HH, Vaders (Listing Multiple Items).

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digital.library.unt.edu

https://digital.library.unt.edu/ark:/67531/metadc853127/
3D PRINTING

AKA: Additive manufacturing

A process by which 3D objects are fabricated, layer by layer, through computer control.

Image source: http://www.3ders.org/images/3dmonstr-3d-printer-5.png
Fused Deposition Modeling (FDM) printers heat a thermoplastic filament to its melting point and extrude it, layer by layer, to create a three dimensional object.
PROJECT OUTPUT
A PROJECT IS BORN
SUCCESSFULLY
- Scanned the artifacts’ physical information
- Uploaded that information to a digital repository in a meaningful way
- Provided world-wide access to aspects of unique, non-circulating items
RESULTS: INFORMATION IS STILL LIMITED

• Support for collection is still limited
  ○ Physical data is still static
  ○ Data does not include text
• Support for pedagogy is limited
  ○ Can help convey size of miniature
Can we apply it elsewhere?

- Workflow established
- Proved viability of 3D scanning rare/fragile items
- Provided inspiration for other projects
DEMAND FOR BOOK HISTORY INSTRUCTION

**ENGLISH 5750: Methods of Historical Research**

Examination of the basic problems and methods pertinent to the use of primary materials in literary research; consideration of types of bibliography, problems in textual analysis and editing, and approaches to archival research and literary history.

**College of Visual Art and Design**

- ASTU 5305: Advanced Artist’s Bookmaking
- ASTU 5300: Printmaking studio
- ADES 1510: Typography
BOOK HISTORY TEACHING TOOLS

UNT Teaching Collection includes:
- Various loose wood and metal type
- Adjustable compositing sticks
- A single locked up broadside forme
- Format sheets for folding exercises
- Book Arts Press instructional videos
  - From Punch to Printing Type
  - The Making of a Rennaissance Book

ISO: An adjustable hand mould
ADJUSTABLE HAND MOULDS ARE EXPENSIVE

Custom built

$3,000 - $4,000
DO YOU WANT TO MAKE A HAND MOULD?

WE HAVE
● A workflow for scanning rare materials to capture physical information
● An in-house makerspace with 3D printing technologies
● A (friendly!) colleague with a hand mould
3D printed History Of The Book EDUCation
SOURCE MATERIALS
3DHOTBED TEACHING TOOLKIT

https://digital.library.unt.edu/explore/collections/THREED/

- Available as a complete set or individual data sets
- Freely available in the UNT digital library
- Accessible through 3Dhotbed.info
VISIT TO TEXAS A&M
VISIT TO TEXAS A&M
THE 3DHOTBED PROCESS
NEXT ENGINE HD 3D SCANNER
3D SCANNING

AKA: 3D Imaging, Laser Scanning, Laser Digitizing, and Digital Shape Sampling & Processing

Digital method for analysing real-world objects using laser or light to capture information about the object's shape, size, and possibly color.
POSITIONING OBJECTS FOR SCANNING
SCANNER SETTINGS

Setting Options
Positioning
Divisions
Resolution
Target
Range
Time
## RECORDING SCANNER SETTINGS

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@3Dhotbed
RE-ORIENTING OBJECTS

Capture scans/data from all sides
PRE-TREATING MODELS
Meshlab Model Post-Processing
Meshlab
Final
Model
Meshmixer Inspection Tool
Meshmixer Analysis on Final Mould 2
PROTO-TYPING

Models printed at 50% to test fit
MOULD #2: FINAL PRINTS
MOULD #1

BIGGER SPRING = BIGGER PROBLEMS
MOULD COMPLETE - ONTO PIECES
PROCESSING SCANNED PUNCH
PROCESSING SCANNED PUNCH
PROCESSING SCANNED TYPE PIECES
PRINTING SCANNED TYPE PIECES
CONSULTING WITH OUTSIDE VENDORS
3D MODELLING

3D models can be created by hand, through procedural modeling, or scanning.

Process of developing a mathematical representation of a three-dimensional surface of an object via specialized software.
UNT FABLAB
PROJECT ESTIMATE

Analysis and Research: 5 hrs
CAD Design: 10 hrs
Rapid Prototyping: 20 hrs
Total: 35 hrs
Total Estimate Cost: $1,100
SCANNED PRINTS vs MODELED PRINTS

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TOOLKIT & IMPLEMENTATION

@courtneyEjacobs
@3Dhotbed

https://texashistory.unt.edu/ark:/67531/metadc288209/
3DHOTBED TEACHING TOOLKIT
ADDITIONAL TOOLS - COMPOSING STICK

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@3Dhotbed
Modeling opens up a world of possibilities for generating data for objects we cannot access.
WOODCUT FACSIMILE

Der Schriftgiesser (type caster) from Sach and Amman’s *Das Ständebuch*. Germany, 1568.
Resin Printing:

Resin Printing (or Stereolithography): Photosensitive liquid resin hardened into solid through the exposure of certain light frequencies. A Digital Light Processing Projector exposes and hardens the resin layer by layer to fabricate an object with increased detail on a smaller scale.
INTRODUCTION TO LETTERPRESS PRINTING
PROGRAMMING
BOOK HISTORY MAKER FAIR

Event sponsored by the Digital Humanities and Collaborative Programs Unit of the Public Services Division of the University of North Texas Libraries, with financial support from the Critical Digital Pedagogy Faculty Network.
BOOK HISTORY MAKER FAIR

TYPE DESIGN
TYPE CASTING
SETTING TYPE
IMPOSITION
PRINTING
FORMAT
BINDING

@courtneyEjacobs
@3Dhotbed
CONNECTING 500 YEARS OF PRINTING HISTORY
WE DID THIS COOL THING (AND SO CAN YOU)

Get your data!
- UNT Digital Library
- 3dhotbed.info

Be our Partner!
- Print a toolkit
- Take the survey
- Tell us your thoughts
- Suggest more tools

https://tinyurl.com/3dhotbedprint

@courtneyEjacobs
@3Dhotbed
Thank You!

UNT Libraries Green Light To Greatness
UNT Libraries Digital Humanities and Collaborative Programs Unit in the Public Services Division
Bob’s Hub from 3D Hubs
Marker Tree3D
UNT Libraries Makerspace “The Factory”
UNT College of Arts and Visual Design Fab Lab

This presentation is also available at tiny.cc/3dhotbedrbms