

Accessing Digital Art: Emulation and Preservation of Complex Digital Art Objects



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Digital Library Federation

2014 October 29



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Rose Goldsen Archive of New Media Art

Founded in 2002

Research Repository



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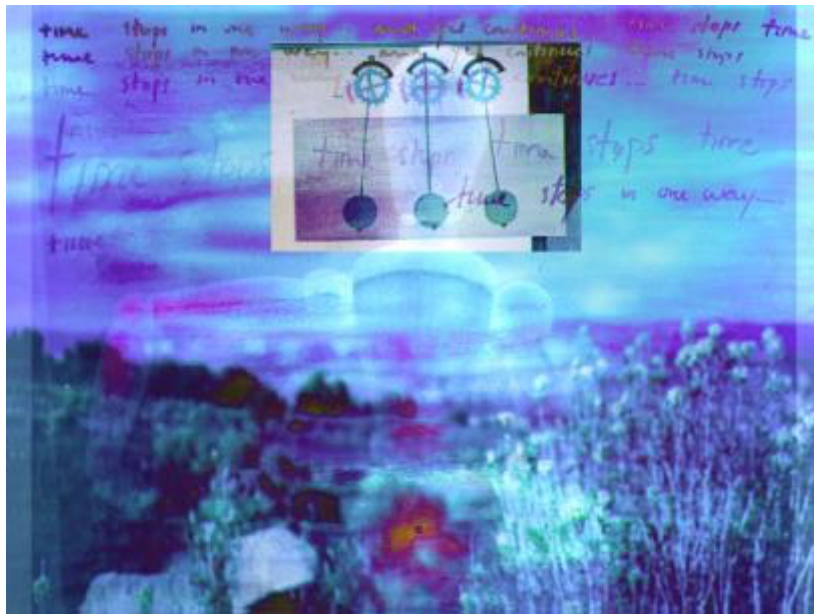
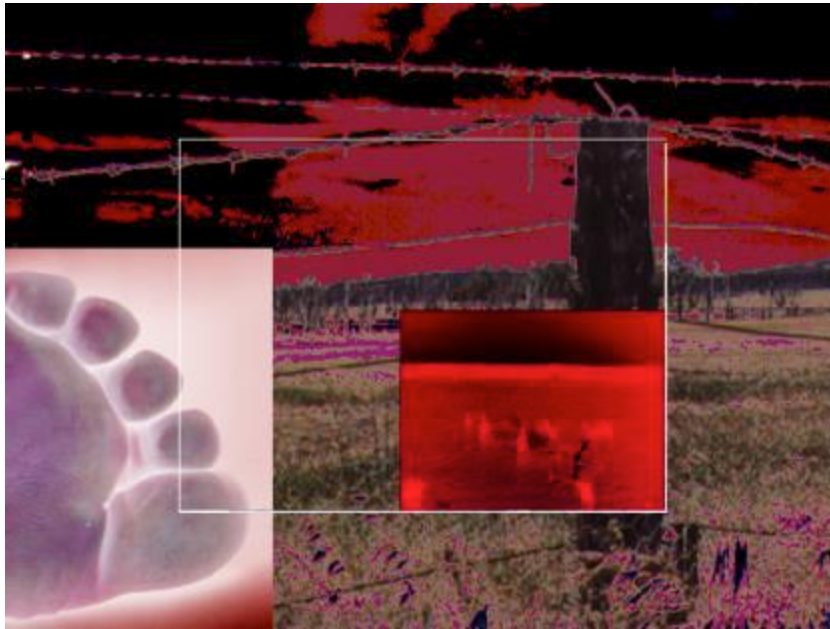
Complexity of Works

Interactivity

Non-linear form

Visual, aural and textual interplay

Storage strategy of media



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Preservation & Access Framework



Develop methodology for analysis of works

Define significant properties

Develop metadata requirements

<https://confluence.cornell.edu/display/pafdao/Home>



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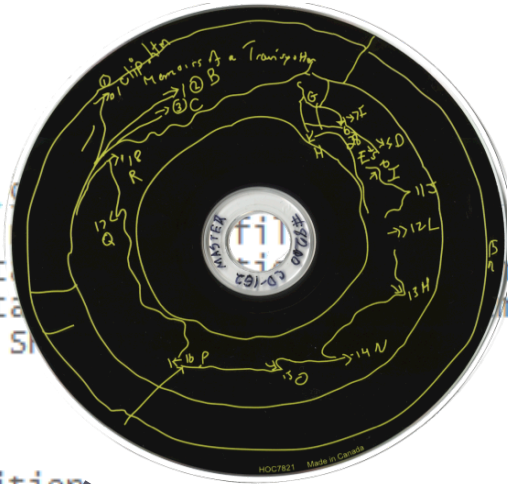
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Acquisition

```

Linux device      : /dev/sr0
Device size      : 671913984 (671.9 MB)
Format           : Linux split dd
Image path and file name: /media/sdb1/data/
Info path and file name: /media/sdb1/data/
Hash calculation : MD5, SHA-1 and SHA-256
Source verification : on
Image verification : on

```



Creating Disk Images

```

No bad sectors encountered during acquisition
No bad sectors encountered during verification
State: Finished successfully

```

```

MD5 hash          0478b5124ece5c7
MD5 hash ver      0478b5124ece5c7
MD5 hash ver      0478b5124ece5c7
SHA1 hash         ff5465bba4c67572efbe85
SHA1 hash ver    ff5465bba4c67572efbe85
SHA1 hash ver    ff5465bba4c67572efbe85
SHA256 hash       4a1007d45e307871a548eb
SHA256 hash ver  4a1007d45e307871a548eb
SHA256 hash ver  4a1007d45e307871a548eb
Source verif     he same data during ac
Image verifi     tly the data that was

```

01000011 01101111
 01110010 01101110
 01100101 01101100
 01101100 00100000
 01010101 01101110
 01101001 01110110
 01100101 01110010
 01110011 01101001
 01110100 01111001

```

Acquisition
Verification
Ended
Acquisition
Verification
format YYYY-MM-DD HH:
hours, 4 minutes and 56
minutes and 28 second
minutes and 27 second

```

Sector-by-sector copy of CD-ROM

Retain disk structure and contents; separate from fragile media

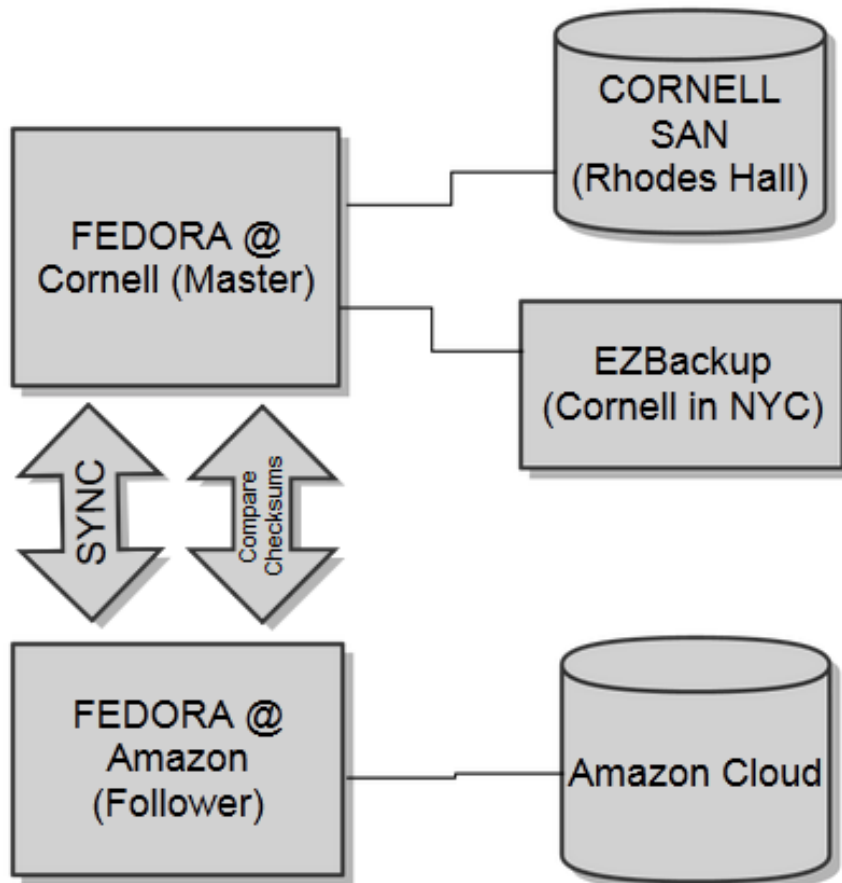
Derive Guymager output



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Preservation

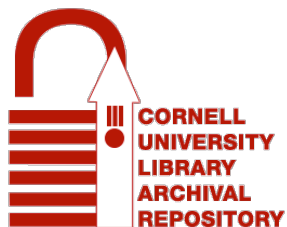
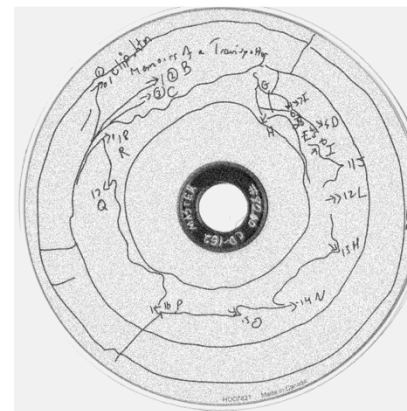
Dark Archive

NDSA Level 1

Fedora storage:

3 types of objects:

Resource
Aggregate
Metadata



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DC



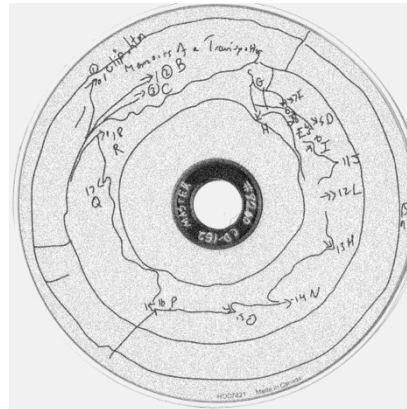
JHOVE Metadata



```

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  <date>2013-03-29T17:20:05-04:00</date>
  <repInfo uri="/cular_prod_ingest/ingest/eclipse/appdata/ingest/LEPPReports_0703_20130329_1364592001/LEPPReports/CLNS/1979/CLNS97-1457/fig2.ps">
    <reportingModule release="1.3" date="2006-09-05">ASCII-hul</reportingModule>
    <lastModified>1997-02-03T09:19:14-05:00</lastModified>
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    <format>ASCII</format>
    <status>Well-Formed and valid</status>
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    <properties>
      <property>
        <name>ASCIIMetadata</name>
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          <property>

```



Metadata

Collection-level dmd

Technical description & checksums

Valid XML accepted



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Structuring Deposit : the obvious

Individual
Work

MARCXML

Disk Image

**Disk image 1
Disk image 2...
Guymager txt file**

Derivatives
(as needed)

**Disk image 1
Disk image 2...
Documentation...**

Related

**Image files of cases,
booklets, flyers, inserts,
etc. associated with work**

Structure predictably
ordered & extensible

Metadata indexing

**Resource
Aggregate
Metadata**



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```
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```

Metadata

DFXML & additional Utility outputs

Issues:

- HFS information
- non-automatically derivable
- over-description

Structuring Deposit : file information

Individual
Work

MARXML

Disk Image

DFXML

PREMIS

Disk image 1

Disk image 2...

Guymager txt file

Derivatives
(as needed)

DFXML

PREMIS

Disk image 1

Disk image 2...

Documentation...

Related

Image files of cases,
booklets, flyers, inserts,
etc. associated with work

Metadata indexed

- access points
- attributes & dependencies

Resource
Aggregate
Metadata



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Emulation

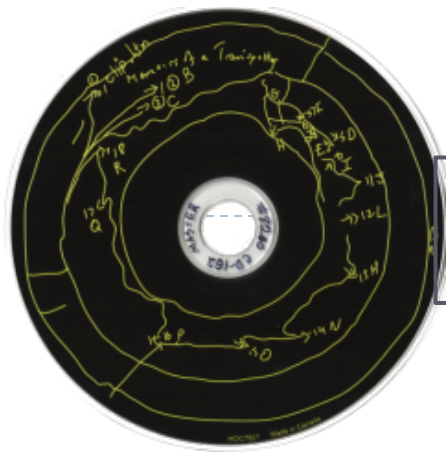
Interaction to fulfill research needs

Layers of the Stack

“Depth” of emulation

Mac vs. Windows

WINE compatibility layer



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Classification fallacies

Compiled code & executables

Emulation-dependent

Difficult to provide access

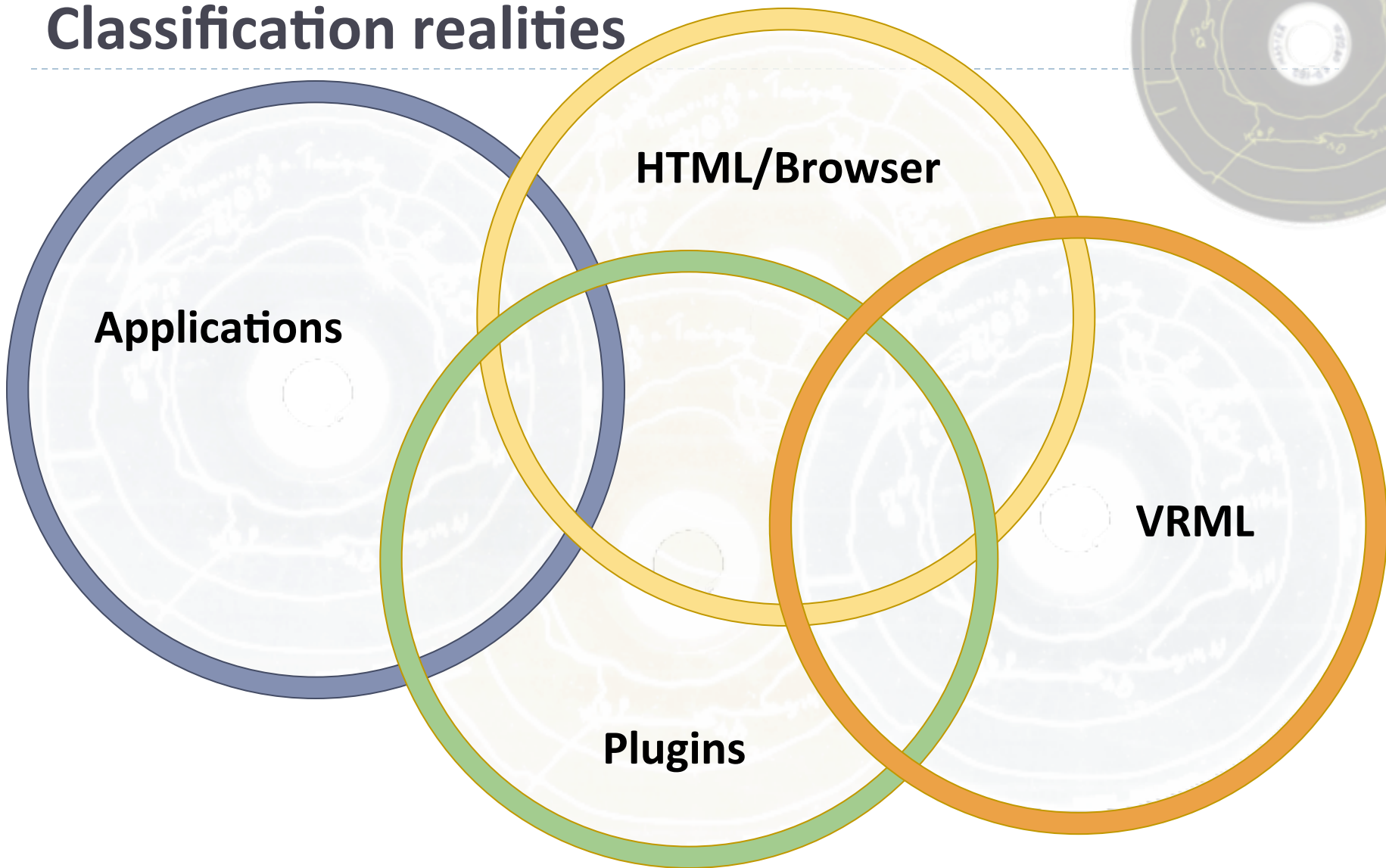
Web files, markup languages

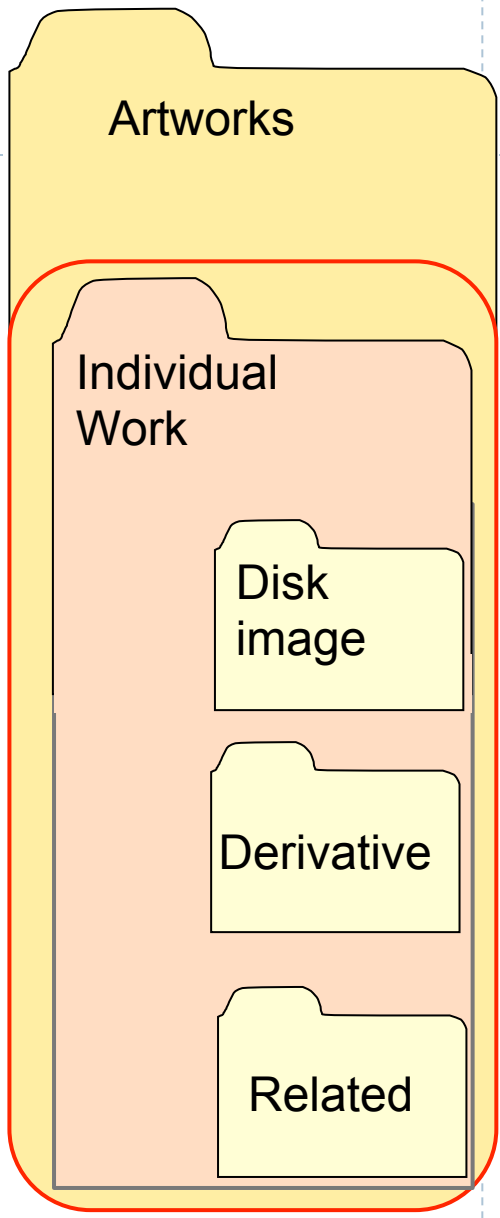
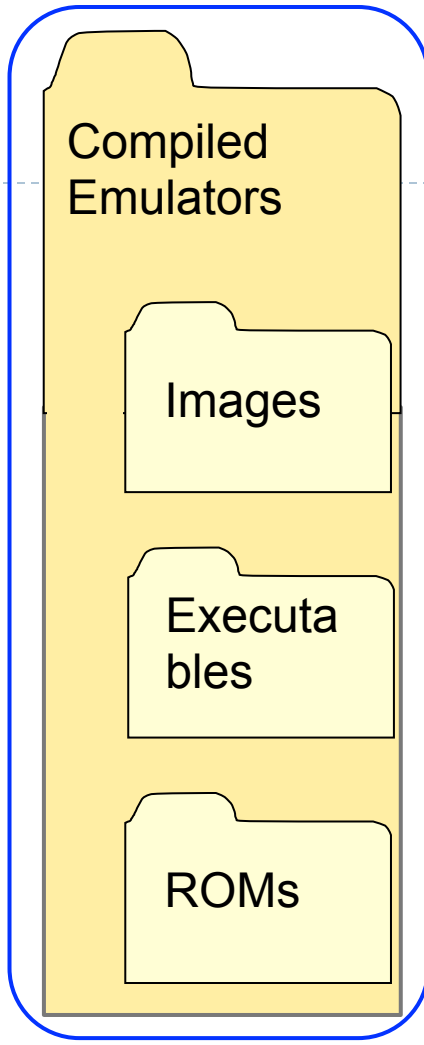
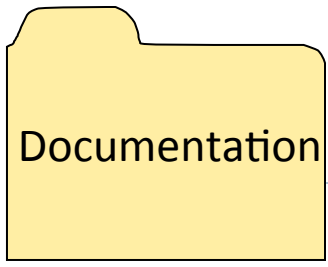
Browser-based

Easy to provide access



Classification realities



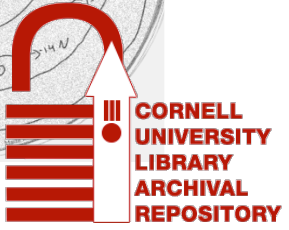


Structuring Deposit

Clarity for stewards

Facilitate future research

Assist in future emulation strategies



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Project Team



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- **Cornell Team:**

Desiree Alexander, Madeleine Casad, Dianne Dietrich,
Jason Kovari, Danielle Mericle, Liz Muller, Michelle Paolillo

Grant PIs: Oya Rieger, Timothy Murray

- **Consultants:**

AVPreserve: Alex Duryee, Chris Lacinak, Kara VanMalssen

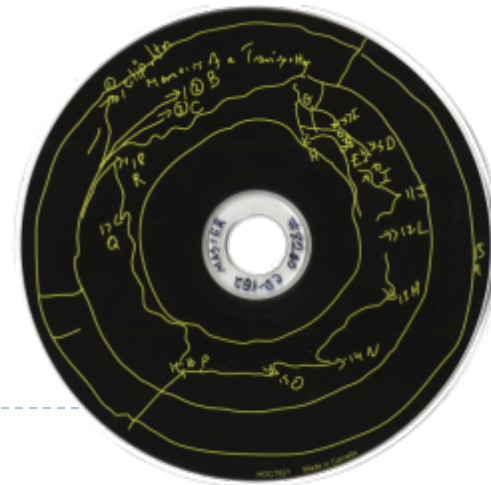
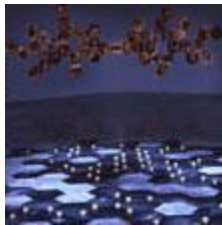
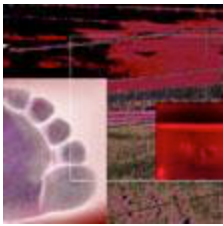
- **Advisory Board:**

Ben Fino-Radin, Jean Gagnon, Rebecca Guenther, Matthew
Kirschenbaum, Jon Ippolito, Norie Neumark, Christiane Paul,
Richard Rinehart, Simeon Warner

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▶ Any views, findings, conclusions, or recommendations expressed in this presentation do not necessarily represent those of the National Endowment for the Humanities.

Discussion



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Image credits (in order of appearance)

- The mid-90s is under this car. Picture taken by Dianne Dietrich.
- Physical CD – David Thomas; The Encoded Eye, The Archive, and its Engine House
- Rare and Manuscript Collections (interior) –
http://rmc.library.cornell.edu/presidents/view_image.php?img=97
- Norie Neumark; Shock in the Ear – Screenshot from Contact Zones webpage:
<https://contactzones.cit.cornell.edu/artists/neumark.html/>)
- CULAR Logo – Carla DeMello
- Shattered CDs – photo by lydyth;
<http://www.pxleyes.com/photography-picture/4b58e0e25d4d1/Dreaded-Broken--amp--Damaged-CD-s.html/>
- Yassine Bouhlel; A Nostalgic Rummage Through the History of Flash
<http://code.tutsplus.com/articles/a-nostalgic-rummage-through-the-history-of-flash--active-6733>



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- The Telegraph. Apple Mac computers through the ages, <http://www.telegraph.co.uk/technology/apple/4315904/Apple-Mac-computers-through-the-ages.html?image=3>
- Selected screen captures – Norie Neumark, Shock in the Ear; Renate Ferro, Panic Hits Home; Yao Jui Chung, The Soul Is But One Instant; Mark Hansen, Ben Rubin, Listening Post; Reginald Woolery, Million Man March/World Wide Web (From Rose Goldsen Archive of New Media Art homepage, <http://goldsen.library.cornell.edu/>)

