

# Developing Software Preservation and Emulation Practice at the University Library

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**I** ILLINOIS



# Introduction

## Preservation Week! Schedule of local Preservation Week events:

[https://wordpress.library.illinois.edu/staff/preservation/services/education\\_training/preservation-week-2019/](https://wordpress.library.illinois.edu/staff/preservation/services/education_training/preservation-week-2019/)

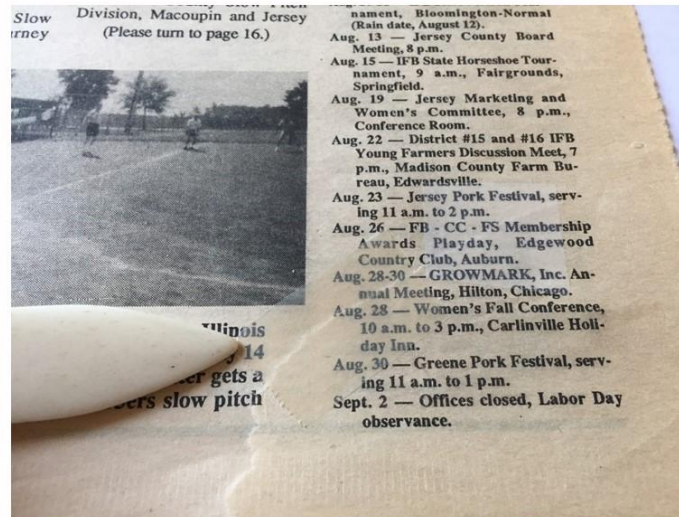
### Preservation Week – April 21-27, 2019

All are Welcome!

Wednesday April 24th  
Main Library, Room 428  
*Time: 1-2 pm*

From Paper to Film:  
The HPNL Newspaper-  
Microfilm Project

Event Type: Demonstration  
Instructors: William Schlaack  
& Cristina Kuhn



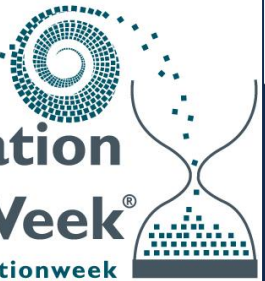
<https://go.library.illinois.edu/preservationweek2019>

pass it on ...

Preservation  
Week®

April 21–27, 2019

[www.ala.org/preservationweek](http://www.ala.org/preservationweek)



# Introduction

## Outline:

- Broad overview of select local digital preservation activities
- Emulation
- FCoP Project



# Digital Preservation @ University Library



- Transfer work is completed in the born-digital reformatting lab
- Primary preservation and access strategy used is migration



# Software Dependency

- Legacy born-digital collections dependent upon legacy and often obsolete versions of software



Image 1

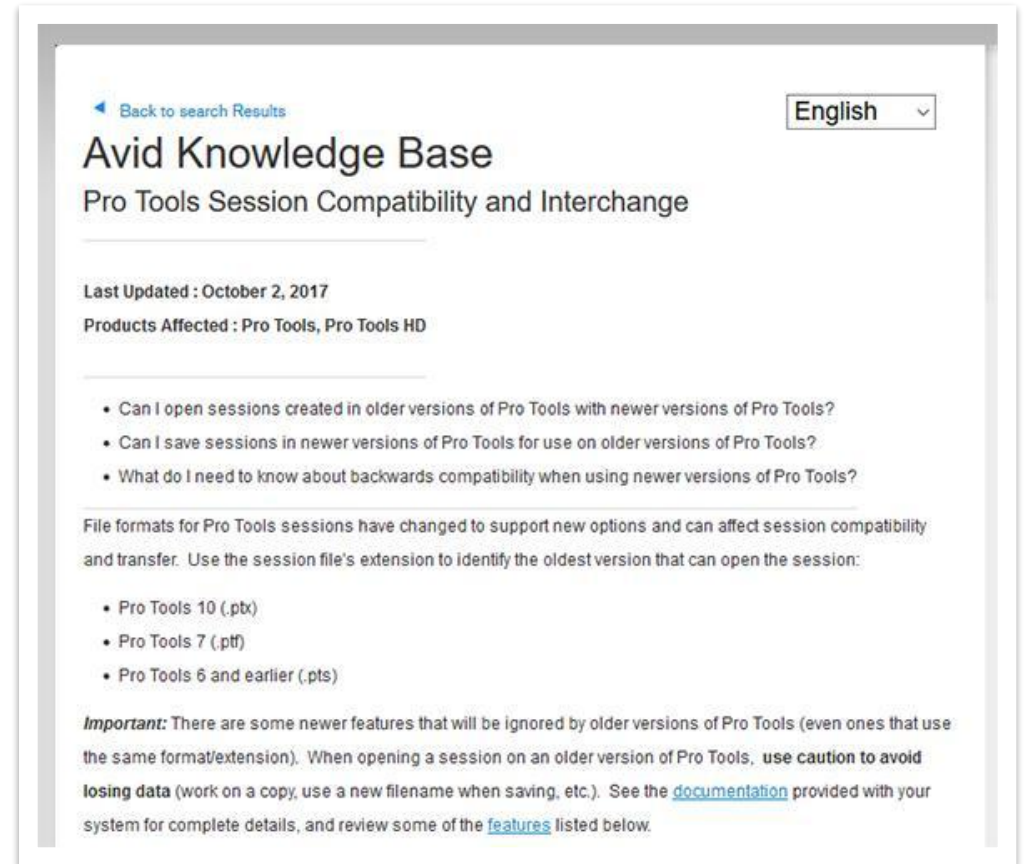


Image 2



# File Format Registry

The screenshot shows a web browser window with the URL [https://medusa.library.illinois.edu/file\\_formats/264](https://medusa.library.illinois.edu/file_formats/264). The page title is "File Format: Lotus 1-2-3 Worksheet File Format". Below the title, there is a section for "Format" with the following details:

- Name:** Lotus 1-2-3 Worksheet File Format
- Pronom:** x-fmt/117 (1.0), x-fmt/114 (2.0), x-fmt/115 (3.0), x-fmt/116 (4-5)
- Policy Summary:**
- Logical Extensions:** wks, wk1, wk2, wk3, wk4, 123
- Related File Formats:**

Below this information, there is a section for "File rendering profiles:" which includes a table with the following data:

Name	Status	Software (Version)	OS (Version)	Content Types	File Extensions
WK1 in LibreOffice on Windows 10	active	LibreOffice (6.0.5)	Windows (10.1703)	application/vnd.lotus-1-2-3, application/x-123	wk1

The table also includes a "Filter results:" input field and a "Showing 1 to 1 of 1 entries" indicator at the bottom.

Example file format registry entry

- Local effort to record knowledge about challenging file formats with the goal of improving access
- Built as part of the Medusa Digital Preservation Repository Collection Registry



pass it on ... 

**Preservation Week**<sup>®</sup>

April 21–27, 2019 


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# What is Emulation?

“ Emulation – combines software and hardware to reproduce in all essential characteristics the performance of another computer of a different design, allowing programs or media designed for a particular environment to operate in a different, usually newer environment”

<https://dpworkshop.org/dpm-eng/terminology/strategies.html>

(Digital Preservation Management - Digital Preservation Strategies)



```
Welcome to DOSBox v0.74

For a short introduction for new users type: INTRO
For supported shell commands type: HELP

To adjust the emulated CPU speed, use ctrl-F11 and ctrl-F12.
To activate the keymapper ctrl-F1.
For more information read the README file in the DOSBox directory.

HAVE FUN!
The DOSBox Team http://www.dosbox.com

Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>_
```

Image 3



# Emulation in Practice

- Is accepted as a digital preservation strategy
- implementation and use is often limited
  - to research projects
  - to institutions that have resources



Image 4: author Salman Rushdie's computers





# Emulation Benefits

- good choice when the look and feel of digital content is important to retain
  - Digital artworks, complex digital objects, games, etc.
- Allows users to engage with a closer representation of the original environment
  - Maintaining some use context
- May facilitate access for appraisal



# Emulation and Software Preservation

- Our digital cultural record depends upon software preservation to retain and render software-dependent digital objects
- emulation environments are heavily dependent upon software availability

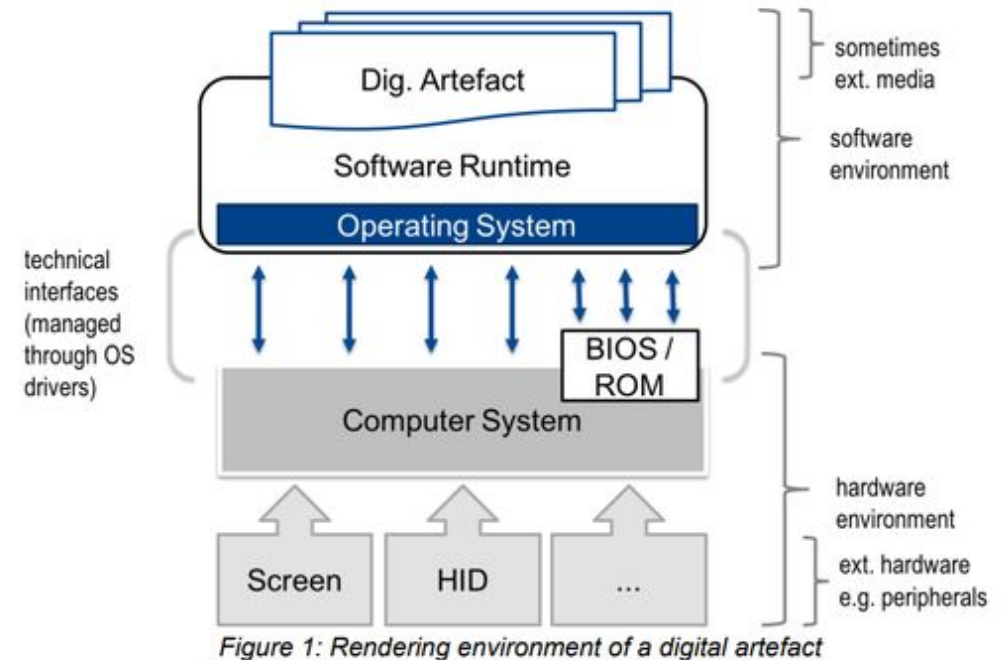


Image 5 from the Tate Museum



# Developing Emulation Practice Locally

- Previous investigations into applying emulation and encountered common setbacks
- Fostering Communities of Practice: Software Preservation and Emulation in Libraries, Archives and Museums  
<https://www.softwarepreservationnetwork.org/fcop/>
  - IMLS grant RE-95-17-0058-17] subproject



Image 6

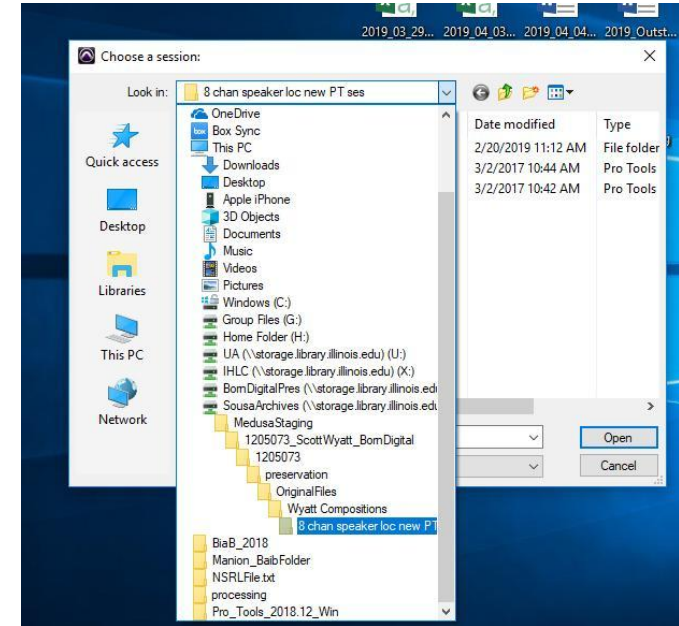
Local project team:

Tracy Popp (project lead)  
Kyle Rimkus  
Seth Robbins  
Karl Germeck



# About Our Project

- preserving, improving discovery of and providing access to files created by contemporary music composers in Sousa Archives and Center for American Music (SACAM) collections
- emulated/virtual environments to present the working context
- Scaling work to meet future need
- centered around born-digital collections of three Illinois composers
  - Michael Manion:
  - Peter Micahlove:
  - Scott Wyatt:



Scott Wyatt files in file directory tree



# Timeline and Research Areas

- Timeline:
  - accepted late winter 2018
  - project ramp-up in late spring to end of July 2018
  - in-person kick-off meeting August 1-3, 2018
  - Core project activity from August 2018 through November 2019
- Core research and investigation areas:
  - Legal
  - Metadata
  - Technical preservation
  - Knowledge development
  - Outreach and information sharing
  - Experimenting and testing emulation software



# Scaling Emulation and Software Preservation Infrastructure (EaaSI)

- concurrent grant project under the Software Preservation Network administrative umbrella
- scaling the technological framework necessary for multiple institutions to configure, share, and access software and configured environments
- includes access to configured software environments
- EaaSI Handbook:  
[https://eaasi.gitlab.io/eaasi\\_user\\_handbook/guide/introduction.html](https://eaasi.gitlab.io/eaasi_user_handbook/guide/introduction.html)

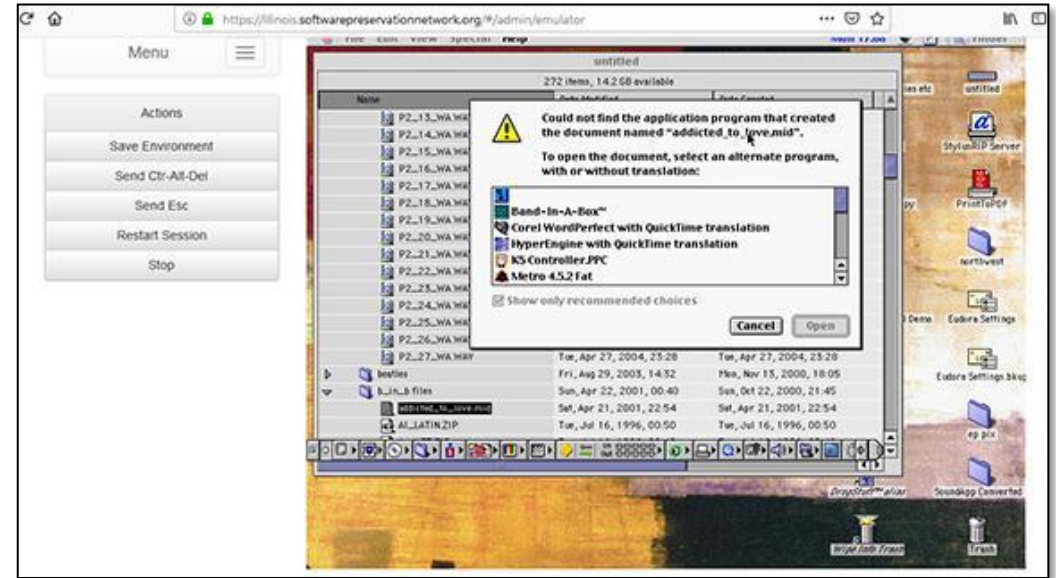
## FCoP Cohort Role

- “kicking the tires” and providing feedback
- Making decisions and establishing workflows
- Requesting features and testing them



# Local FCoP Activities

- Lots of activities happening concurrently
- Where we are currently:
  - core work of the project
  - Intensive collection curation work on Manion collection
  - emulated environment generated from an .E01 forensic disk image

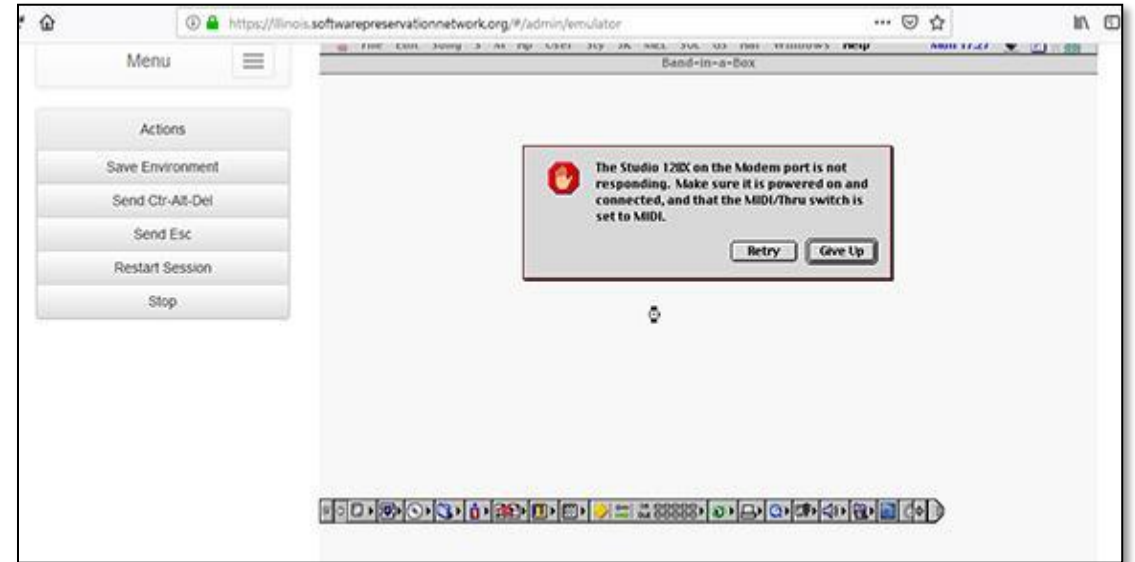


<https://illinois.softwarepreservationnetwork.org>  
(requires login that I'm not sharing yet 😊)



# About the Emulated Environment

- Important milestone, but only tip of workload iceberg
- At this point the environment is most useful for appraisal
- Content has not been processed
- Technical issues



Manion EaaS environment - error due to missing external hardware





# Engaging Archivists and Curators

- Emphasize need for archivists and curators to:
  - Gather as much information as possible
    - about the creation context and files of interest
    - document the creator or donor walking through the software interface if possible
    - Identify content of value
  - Engage early with digital preservation specialists
    - Don't necessarily want to encourage transfer to a secondary storage medium
  - Get clear permissions on use and access



# Selection and Prioritization

- EaaS lowers the barriers to implementing emulation strategies somewhat but getting to the point of emulation is still resource intensive
  - team assembled for FCoP project is temporary
  - developing thorough project plan
- Establishing criteria for selecting and prioritizing projects
  - What makes a good candidate for emulation services
  - At what level will collections be emulated
  - Gauging if there is enough information about the collection



# Making the Work Visible and Sharing Experiences

- Making the work scalable includes
  - Engagement and training
  - Articulating and documenting the work and processes
  - Identifying responsibility
  - Outreach is important for information sharing and building support!
  - Creating documents to share as part of FCoP project



# Future Work

- User testing of the EaaS environment
- Creating migration pathways
- Developing a more formalized software preservation practice
- Determining if we will have continued access to EaaS
- Continue working with the Software Preservation Network



# Resources

- About EaaS: <https://www.softwarepreservationnetwork.org/eaasi/> (accessed 4/17/2019)
- bwFLA - Emulation as a Service: <http://eaas.uni-freiburg.de/> (accessed 4/17/2019)
- Code of Best Practices for Fair Use in Software Preservation:  
<https://www.softwarepreservationnetwork.org/bp-fair-use/> (Accessed 4/19/2019)
- EaaS Handbook: [https://gitlab.com/eaasi/eaasi\\_user\\_handbook](https://gitlab.com/eaasi/eaasi_user_handbook) (accessed 4/21/19)
- On the Rushdie project, “one of the biggest lessons learned noted by Waugh was the need to document everything the software engineers do as their work is just as ephemeral as the born digital information they wished to preserve”:  
<https://ws-dl.blogspot.com/2017/04/2017-04-17-personal-digital-archiving.html> (accessed 4/21/19)
- Software Preservation Network: <https://www.softwarepreservationnetwork.org/> (accessed 4/22/19)



# Image Sources:

image 1 (slide 4): <https://prodesigntools.com/open-use-save-adobe-cc-files-cs6.html> (accessed 4/22/19)

image 2 (slide 4): [http://avid.force.com/pkb/articles/en\\_US/compatibility/en353093](http://avid.force.com/pkb/articles/en_US/compatibility/en353093) (accessed 4/22/19)

image 3 (slide 6) [https://commons.wikimedia.org/wiki/File:DOSBox\\_screenshot.png](https://commons.wikimedia.org/wiki/File:DOSBox_screenshot.png) (accessed 4/22/19)

image 4 (slide 7)

<https://www.newyorker.com/tech/annals-of-technology/digital-life-salman-rushdie> (accessed 4/20/19)

image 5 (slide 9)

<https://www.tate.org.uk/sites/default/files/styles/width-600/public/images/emulationbased.png> (accessed 4/22/19)

Image 6 (slide 10) <https://www.softwarepreservationnetwork.org/fcop-cohort/> (accessed 4/22/19)



# Thank You!

## Questions?

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