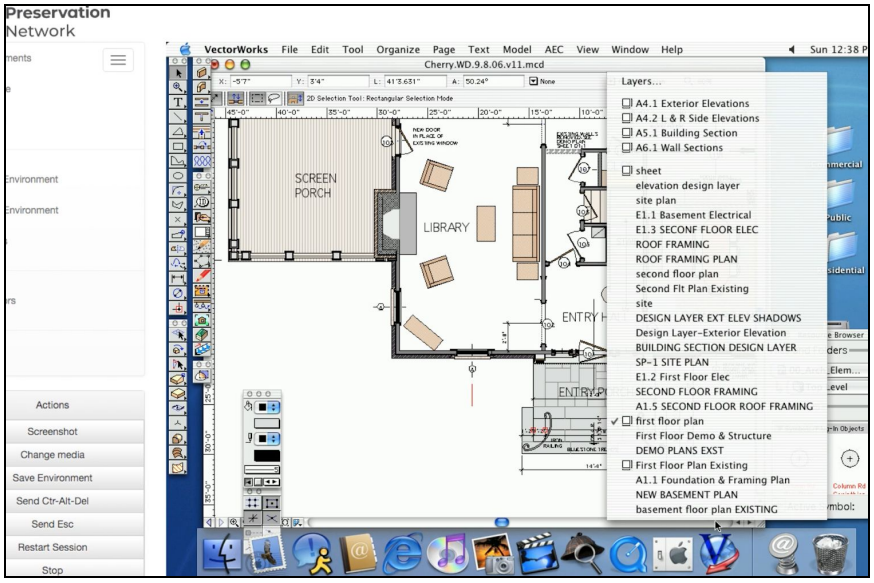
Fostering a Community of Practice at the University of Virginia Library

Grant report for the University of Virginia Library role in the Software Preservation Network FCOP cohort, 2018-2020.



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Introduction

In early 2018, the University of Virginia Library was selected as one of 6 institutions to take part in the Fostering a Community of Practice (FCOP) grant from the Software Preservation Network (SPN). SPN was awarded an IMLS grant (RE-95-17-0058-17), part of which was applied to the creation of a cohort that would work to establish a community of practice in software preservation and emulation within libraries, archives, and museums.

We were interested in the grant for several reasons:

- **To test and refine institutional tools, systems, and workflows** to accommodate the increasing number of born digital materials, including software, that the Library and archives are expected to steward as part of the mission of a large research institution.
- **To put theory into practice for digital preservation:** access to emulation-as-a-service (EaaS) platforms and technical support provided an opportunity to test some assumptions around preservation strategy, and the scalability of preservation and access workflows that may rely on emulation.
- **To contribute to a growing network and open community with a purpose** to create, sustain, and share software preservation and digital stewardship resources widely over the long term.

This report provides an overview of the last two years of grant work from the UVA FCOP team and is structured into three components:

- An overview of our use case and context at UVA
- A review of grant work outcomes in curatorial, metadata, technical and user experience/community building areas of focus
- Recommendations and next steps for this work at UVA, including transitions to UVA's dual role as a node in the Yale Emulation-as-a-Service Infrastructure project

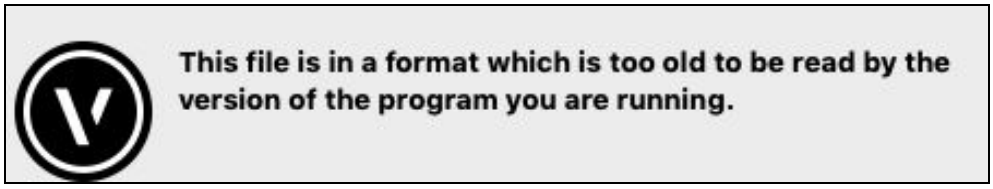
Additional team members who helped us during the grant and within the course of their normal duties at UVA included: Melinda Baumann (User Experience), Ann Burns (Metadata), Brandon Butler (Information Policy), Christopher Welte (User Experience), Penny White (Reference, Special Collections) and Chip German (AP Trust/EaaSI Node Lead).

UVA put on a free workshop during the course of this grant, and special thanks go to all of the UVA volunteers across departments who aided this event, as well as facilities and audiovisual staff who made it possible.

All internal meeting notes and working documentation for the grant can be found on Confluence under Digital Preservation/SPN FCoP Project. All internal and external presentations, outreach, workshop and other materials can be found in Appendix A and linked throughout this report.

UVA's grant use case: Emulation in the Archives

Architectural materials are one of the collecting priorities for the Albert and Shirley Small Special Collections Library, and our "Emulation in the Archives" project focused on a single hybrid collection, (meaning the collection contains both analog and born digital materials), of a local Charlottesville architecture firm, Sheeran Architects. This collection also includes commercial computer-aided design/building information modeling software (CAD/BIM) known as Vectorworks, which is necessary to review and access the digital architectural files.



This use case not only reflects many of the more recent hybrid collections in our archives and special collections, but also represented a category of use case previously identified by the SPN Curation-Ready working group in 2017 - materials that depend on software and the preservation of that software to provide ongoing access to unique data over time. Even though this unique collection consists of digital materials that are only 10-20 years old, many unique files were already incompatible or "too old", as the error message above says, to even open in available modern viewers in 2020.

UVA's project had several goals aimed at developing our institutional capacity to acquire, preserve, and provide access to software and born-digital materials dependent on software. We targeted areas of curation, description, and technical work in our application for the grant, **with a focus on a lightweight, "just in time" approach that we thought would suit the scope of the grant and reflect our institutional realities and resourcing**.

Curatorial

Our focus on curatorial work for the grant reflects the need for early intervention and understanding in archives around the acquisition and processing workflows to aid in an informed preservation and access strategy for born digital materials and software.

Reflecting our "just-in-time" approach, we first focused on updating and reconfiguring existing documentation such as:

- Providing feedback and updating our Deed of Gift in coordination with Brandon Butler around born digital materials
- Contacting the donor of the collection with the updated Deed of Gift with the new digital addendum and rights information
- Refining the existing Digital Donor checklist for born digital materials and software

Additionally, while reviewing our workflows, identifying gaps, and grappling with the specific questions that emerged from hands-on work with software in our collections, we saw the need to create a new resource to aid this work internally at UVA that could also be applied more broadly in the library and archives community. Early intervention and knowledge gathering for software and born digital materials is paramount for preservation, and we attempted to address this reality by:

- Creating a **Software Questionnaire** for archives that addresses the legal, technical, administrative, and collection questions that may arise when considering the acquisition of born-digital material dependent on software, or the acquisition of that software itself as an object of archival interest.
- The questionnaire was then reviewed by legal experts and experts in the field of archives and software preservation. It provides a way to begin a conversation and investigate important preservation and access considerations prior to or during the acquisition process with donors and researchers.
- It can be used and integrated into the work of curators, accessioning archivists, processing archivists, university archivists, and preservationists as the information drawn from these questions and answers can support appraisal, processing, description, preservation, and access workflows in the years to come for the collection (or can aid in the recommendation of the collection to other collecting institutions).

During the course of our work on this outcome, we were also fortunate to be able to reframe and strengthen some existing collaborations to assist with the detailed work around building and adapting processing workflows for digital materials, architectural materials, and software, including leaning on the expertise of our colleagues whose work may not fall under what people may currently think about as contributing to “software preservation” or “digital preservation”. This includes expertise in metadata, information policy, architecture, public services, and reference.

We also found that education and training around the use of any adapted or new documents and workflows will be essential to our work, along with buy-in and support from Administration on implementation of these documents and workflows. Please see the Recommendations and Next Steps section for curatorial work for our recommendations.

Grant Outcome Documentation	
Curatorial	Digital Donor Checklist V 0.4
Curatorial	Software Questionnaire V 1.0

Metadata

Description of born digital materials in archives has seen great development over the last few years. However, there are very few descriptive examples and frameworks for born digital content dependent on software and emulated environments for access, and description for software itself in non-specialized archives and museums. As part of our grant work, the **UVA team sought to create a descriptive framework for archives to describe and provide access to software and software-dependent born digital materials using archival standards.**

Before embarking on descriptive work for our project focus, we needed to ensure alignment within the broader framework of community standards and best practices. This was especially relevant to the challenges involved with describing both born digital material and the software we relied on to access this content. We were able to consult published documents to inform our approaches:

- The University of California Guidelines for Born-Digital Archival Description helped us organize and describe our digital content within the context of an archival collection.
- The Software Preservation Network's Metadata Model helped us prioritize core elements to include in our description.

We proceeded with experimental description in ArchivesSpace and developed different options to determine how best to meet our user's information needs. As we stepped through our prototype descriptions during the course of our project work, we learned that both Wikidata and WorldCat were excellent sources for tracking down technical metadata for obscure or deprecated commercial software titles.

Worldcat, in particular, was useful for software titles that are commercial in nature, as was the case for the Sheeran Architects collection of CAD/BIM software, which led to the development of a working document for MARC field look-up to aid software description. This workflow step was another aspect of our "just-in-time" approach - leveraging existing resources necessary to process and evaluate the current collection at hand. Our final strategy document for archival description reflects the culmination of this review and research as well as user and community feedback. See the Recommendations and Next Steps section for metadata for our next projected steps.

Grant Outcome Documentation	
Metadata | Description	MARC Field Look-up for Software Description in ArchivesSpace
Metadata | Description	Archival Description Strategies for Emulated Software V 1.0

Technical

Our goals for the project grant on the technical end aligned with our “just-in-time” approach by way of leveraging our developing digital preservation, digital processing, and access workflows to align with components we might need to consider for incorporating software, software-dependent digital materials, and emulated environments into these workflows. For our grant goals, we aimed to document our technical planning and development work to share with the software preservation community as well as the various open source communities that are part of the systems we use, including ArchivesSpace and Archivematica.

In developing the system design for our project goals, **we started first from the ideal vision for access and then worked backwards to determine the needs to support it**. That vision followed this familiar pathway:

- Researchers discover descriptions of these digital materials in UVA systems
- Researchers would be presented with enough information to determine their relevance
- Researchers are also presented with instructions on how to access the materials

For files which rely on obsolete software and platforms, like those in the architectural collection for our grant, access would be provided through emulation. As these were archival materials, our technical approach was shaped by the expectation that at the end of the process we would embed or link to a “view” of the resources within the archival description in ArchivesSpace.

We had already established that digital content (as well as some software necessary to interpret that content) would undergo initial processing using Archivematica. Archivematica allows us to do things like create automatic processing routines to produce technical metadata about digital assets and puts them into Archival Information Packages (as defined in the OAIS reference model).

Having established our ideal presentation and digital workflows, we **just needed to figure out where to store all the bits of metadata necessary to achieve it, then test, build, or implement any missing pieces.**

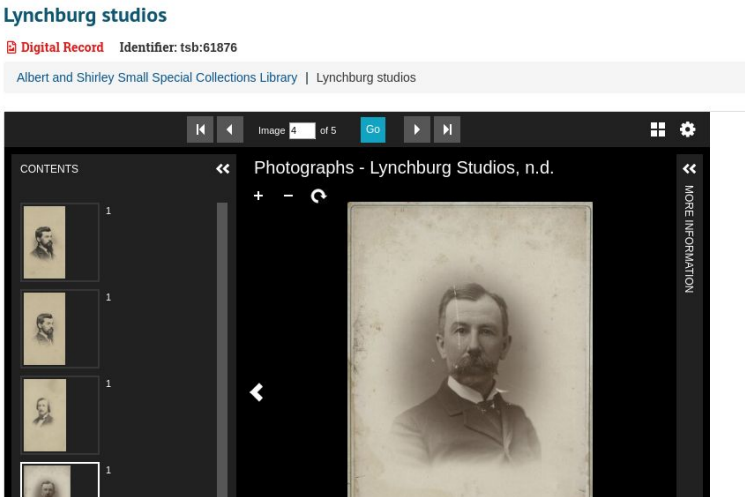
The view of an item requiring emulation, (in this example, a CAD file of obsolete vintage), was established to be an interactive view within the Vectorworks software from the collection, running on an operating system that was contemporary to the software. These authored files would be presented in the EaaS environment with sufficient context to allow modern users to understand both technically complex software, and have a potentially unfamiliar interactive experience.

It is very likely that fewer and fewer patrons will remember - much less be comfortable - with computers or operating systems from around the turn of the century (see the User Experience | Community section for more commentary on this observation). While ultimately we wanted context and help documentation to be available online alongside web-accessible access to the

emulation environment, given the current legal requirement for access to be confined to the reading room, the team decided that currently, that help could take the form of physical documentation or even expert human instruction.

Though use would have to be in person, we proceeded under the assumption that discovery of the materials would not be subject to that constraint. Researchers should be able to find these materials in the context of the collection, and be given instruction about their nature and how to access them in the place where they might one day be able to experience them directly: within an embedded ArchivesSpace digital object.

Digital Objects in ArchivesSpace are essentially just URLs. For simple objects like digital images, we modified the ArchivesSpace public interface to render those objects within ArchivesSpace in the place where the link would normally be present.



We accomplished this embedding by implementing a protocol called oEmbed that allows for a normalized interaction that exposes an embeddable view of a resource from the site that normally presents it. This site is called “Curio” and supports views of simple digital image based materials using standard Javascript libraries to present images which are available over the IIIF (International Image Interoperability Framework) protocol, as well as a more custom view for materials in another digital collection. Our audio/video content management system (Avalon) also supports the oEmbed protocol and could be used to embed views of materials in ArchivesSpace as well.

It was the plan moving forward to extend Curio to support providing an embeddable view of pre-configured access to digital materials using the EaaS platform. Everything necessary to create such a view would represent one minimum set of metadata.

Existing tools, like ArchivesSpace and Archivematica have their place in the workflow and each store metadata appropriate to their intended use, but to provide the kind of view we imagined for these materials, we would need more. Specifically, we wanted to be able to bring in information about the software used in the emulation environment which may allow us to expose documentation, user manuals, or links to get more help. Some of this information could be available in third party systems like WikiData, (which already hold some information about the commercial software from our project, Vectorworks), and in such cases, linking to it (or linking and copying as a hedge against loss of that external system), required us to store identifiers or URLs.

In order to cap the number of systems we would have to integrate to create this ideal view, we chose to leverage a local metadata storage system we called "Apollo" that allows for arbitrary and unconstrained linked data storage. It would allow us to have a place to add any additional metadata that could be associated with records in other systems via shared identifiers.

This plan defined a starting point for a post-processing workflow as well as a system design to expose access to the sorts of materials that were the focus of this grant. It should be noted that this work was performed in parallel with continued developments in the EaaS platform that we used to test our emulation environments, and we will address how we will integrate these developments in our technical Recommendations and Next Steps.

Grant Outcome Documentation	
Technical	Systems and Metadata Diagram

User experience | Community Building

One of our major grant goals was to host a free, one day workshop at UVA that was open to anyone with an interest in learning more about software preservation and emulation in an archival context. Eponymously named for our grant, the "Emulation in the Archives" workshop was originally planned to share our work completed for FCOP thus far, and to host a day of community discussion and learning.

Held in July of 2019, the workshop was well received (but you don't just have to take the UVA team's word for it). In addition to hosting over 50 attendees and presenting the FCOP team work on curatorial, metadata, and technical work, we also:

- Were generously granted funds to allow for two types of scholarships to better support travel and any other barriers that other stop participants from attending a free workshop
- Brought additional guest speakers who had experience with software and emulation to provide perspectives on this work outside of the UVA experience, as well as legal experts like Brandon Butler
- Created a Code of Conduct for attendees of the workshop
- Conducted user tests for emulation environments, which are detailed below

All UVA FCOP presentations, draft working documents, community notes, and guest presentations were made openly available on OSF for anyone in the community to use.

User experience was not part of the team's original grant narrative, but it **became apparent quite quickly during the course of the grant that end-user assumptions around researcher, student, and public services staff access and understanding of emulated environments within an archival context would have very important upstream repercussions** on the rest of our work.

Not only do these decisions include digital material and preservation workflows, (will users be accessing one image of the entire desktop environment with all resources? Or will they access one emulated project folder at a time? Will we expect to provide access to the imaged software only, if a researcher requests that access?), it has major impacts on technical, descriptive, and public services workflows. (How will researchers understand where to navigate for help within an emulator, or assure them that they cannot actually delete anything? Will we provide access to the manuals for software? How will we communicate to external users that you must visit the reading room, despite this being portrayed as a "digital" object? etc.)

Though a small amount of scholarship has begun to focus on the subject of access and user testing for born digital and/or emulated environments in archives, **we saw this grant as an opportunity to touch lightly on these areas in ways that aligned with our broader project goals and gave us ideas about how to move forward in our designs.**

With the help of the UX team including Jill Heinz, Melinda Baumann, and Christopher Welte **we took the following steps during our grant project:**

- Outlined the first steps for user tests and wire frames around how researchers would encounter emulated materials within ArchivesSpace with what was then known as UX, using our other technical and descriptive grant work as a guide (JIRA ticket)
- Performed a small number of user tests during our Emulation in the Archives workshop
- Melinda Baumann **produced an overview report of the results with recommendations** of the initial wireframe testing (see Attachments in the JIRA link above)

Additionally, we also:

- Walked through a "speak aloud" session of the emulated environment with the visiting SPN researcher in August of 2019 (Appendix A), and recorded a screencast and audio as they navigated through the environment
- gathered real time feedback from attendees in the "live" sandbox emulation environment of the collection, during Lauren's 2019 World Digital Preservation Day presentation.

These additional user experience and feedback steps were very helpful to understand how these materials might begin to fit into the universe of staff and researcher access and understanding, as well as initial implications for work within UVA access systems and processes. Please see the Next Steps section for User Experience | Community Building for an overview of our recommended approaches.

Grant Outcome Documentation	
User Experience | Community Building	Emulation in the Archives workshop OSF

Recommendations and Next Steps at UVA

We were fortunate to be a cohort member for this FCOP grant, as our work, and the work of the cohort, can inform practical next steps for scaling and considering archival implementation. UVA also became one of several (EaaSI) nodes, (where work continues), during the course of the FCOP grant, with Lauren Work (and Jeremy Bartczak, as needed) serving on both cohort teams. This gives us a good baseline to build out our additional use cases, continue to test emulation infrastructure tools and workflows, and build UVA community as we aim to expand the exploration of emulation use cases for cultural heritage data and other digital scholarly and cultural materials dependent on software.

The other advantage of being able to run a pilot program in the FCOP cohort is a clearer view of the costs, resourcing, technical work, and training needs locally. While one use case should not shape all decisions around library and archives strategy, there are recommendations that can be drawn from our experience.

Curatorial

This project brought to light that the Special Collections Library needs a more defined approach when considering the acquisition of software and born-digital materials dependent on software. Our curatorial work strove to create some of that structure by updating existing resources, and creating new approaches, (such as the Software Questionnaire), as gaps were identified. Our additional recommendations for this work include:

- **Support and training for new approaches and early intervention:** We need to enlist the support of the curators in using these forms and workflows, and this may mean gaining backing from administrators in sustained support of their implementation. We also need to be sure both the curators and the donors are properly educated about the forms and how to utilize them, and why completing them and leveraging the information gathered is very important. We should also look for opportunities of collaboration and exploration of these new workflows across UVA Library in partnerships with liaisons in departments like Architecture, Computer Science, or Media Studies.
- **Strengthen and clarify collection policy**: The Special Collections Library should seriously consider its appetite for purposefully collecting software, and determine if this would be a collecting focus, or if it would consider software as a type of tangential material we would accept for the informed preservation and access needs of a collection. Either way, when positions like the new University Archivist are hired, it would be beneficial for Special Collections to work with other curators on bringing the collecting policy up to date to address these collection questions.
- **Continue to strengthen infrastructure for born-digital materials, including software:** We need to take a serious look at the infrastructure, (meaning both people and technology), for processing digital materials to make preservation and access to this type of material possible, and make a commitment to provide access for patron

research. This infrastructure could include staff training, documentation, and testing and refining technical systems and public services workflows.

Next steps for our specific grant work in this area includes:

- Finish the processing of the Sheeran Architects born-digital materials collection for eventual access through emulation in the reading room. (Short-term)
- Conduct ongoing testing of curatorial documentation and the software questionnaire for other collections and gather additional feedback from UVA staff. (Short-term)
- We also plan to continue coordination with public services staff to build out training and digital materials around access to digital and emulated materials for researchers, students, and the broader community. (Middle-term)
- Conduct additional user testing in the reading room. (more detail in the User Experience | Community Building recommendations). (Middle-term)
- Plan for remote reading room access protocols. (Long-term)
- One area external to our current FCOP project scope that developed interest during the course of the grant is around the use of emulation for *appraisal* purposes in archival workflows. This is a known interest of several members of the FCOP cohort, and an opportunity for continued community work and research that might be able to better suit some current legal realities for community partners. (Long-term)

Metadata

Our decision from the case study for the grant intentionally emphasizes a fairly granular strategy for describing software titles. This aligns with what we discovered in our review of related community guidelines and with our understanding of the need to inform users with as much technical and bibliographic detail as possible given the ephemeral nature of some titles as software versions evolve.

All theory aside, it remains unknown how sustainable this detailed approach will be in real time scenarios both in terms of staffing resources and in our ability to actually track down the data we wish to document. Our recommendations in this area include:

- **Continue to leverage existing descriptive resources for research and implementation in software description**: It will be critical to continue to fall back on our understanding of how we potentially map MARC data from the trove of legacy bibliographic description created by library catalogers into archival descriptions for commercial software. This type of approach should also be leveraged as much as possible for similar potential explorations into cultural heritage or research data software, where existing community standards can be mapped to software discovery and use needs.

- **Track the efforts of external institutions to develop Wikidata as a potential digital preservation knowledgebase**: This activity is a crucial step for continuing this work in a scalable manner. With Wikidata now occupying center-stage in conversations related to real world application of linked open data in the library and archives communities, this

becomes all the more relevant as an area of fertile exploration for leveraging new technologies to meet these ambitious goals.

Next steps for our specific grant work in this area includes:

- Scaling up description of emulated born digital material and dependent software to test feasibility of our proposed approaches at UVA, and integrating any related local and community feedback. (Short-term)
- We are also interested in continuing to work on our descriptive practices as they relate to integration with UVA's EaaSI node work and additional types of collections outside of the archives, and how we might leverage our existing knowledge to aid development for description across the needs of more Library users. This would be a great space within which we could continue collaboration with other members of FCOP as well as the broader SPN community. (Middle-long term)

Technical

During this grant, the FCOP teams had the privilege to explore, give feedback, and test browser-based, scalable emulation environments that represent an enormous technical and community achievement. It should be known clearly that even with the support of the Yale and SPN teams, plus the cohort and broader digital stewardship community, the work of testing, imaging materials, integrating systems, researching software, user and case study outreach, and troubleshooting is an effort beyond the role of one digital preservation or archives position, especially as we continue with our work in the EaaSI project. Additionally, as evidenced by our work during this grant, components of this effort and community may also touch many familiar roles in description, archival public services and reference, IT, user experience, and information policy.

Exposing and highlighting materials that can be made available through the EaaS platform can help the Library to make informed determinations about the effort necessary to preserve and provide access to collections of any type using this approach. Our "just-in-time" experience during this grant also presented us with fundamental questions about the technical approach for collections that may benefit from the preservation of software and the use of emulation: is this preservation and emulation approach sustainable to take on in a focused manner for collections where digital materials, their context, and associated software and environments are necessary to meaningfully interpret them? Or is the "just-in-time" approach, (often more reliant on outside factors and efforts such as researcher or department interest, grant funds, or archival collection necessity), better to dictate when the use and preservation strategy of this kind are available and implemented? Given our experience during this grant, we recommend:

- **Continue to foster development of the EaaS platform to increase the preservation and access options available to UVA and other institutions.** This support can help better inform some the large technical questions outlined above, and can take the form of local actions at UVA such as:
    - Continuing the test the incorporation of EaaS into our preservation and access strategy for materials like obscure digital file formats or obsolete online experiences and in potential collaborations with AP Trust
    - Providing bug reports and feature development prioritization to the EaaS teams
    - Setting up and testing environments (virtual hardware, operating systems, and required software/libraries) pertinent to our collections to expand the options that are supported in the broader EaaS system and available for all participants

- **Consider further building technical and personnel capacity at UVA for digital materials and software preservation work in place:** As with any new workflow or system development, necessary questions about investments of time and personnel will emerge. Based on our team's experience with this grant, our ongoing work with EaaSI, and the type of work required, we recommend continuing to build capacity by efforts such as:
    - Continue to train archival and descriptive staff in related workflows
    - Coordinate with Library IT partners to contribute and closely monitor the development of financial-sustainability models for enabling technologies such as EaaS so we can anticipate the size and timing of new Library costs that we will need to include in budgets for these external services
        - Also test and track time needed for technical troubleshooting and system testing and system builds to better inform estimates of support for such external services
    - Invest in cross-departmental collaborations to build and test use cases both internal and external to the archives
    - Consider how paid student and graduate work can support building capacity

Next steps for our specific grant work in this area includes:

- Test our assumptions and integrations in our systems and archival workflows, starting with continuing on with the processing workflow for the Sheeran collection in Archivematica and adding metadata information to the UVA metadata repository, Apollo. (Short-term)
- Building the "Curio" view (custom view) outlined in the workflow that will pull metadata and information from various sources, and finding ways to link to that view from ArchivesSpace and other systems. (Middle-long term)

User experience | Community Building

Building community and cohorts was a fundamental component of the FCOP grant. Through our grant work at UVA, we began to build capacity and community for software and software-dependent digital materials preservation and access in the archival context, and have the following recommendations to further this work:

Continue to build community interest and capacity at UVA both within the archives, and external to the archival context by:

- Completing processing work and sharing the Sheeran Architects collection widely as a use case of interest for related researchers, departments and archival communities.
- Developing use cases and community workflows for the preservation of cultural heritage research data to strengthen and test existing UVA interests in the use of emulation for preservation and access.
- Contributing case studies and use case experience to ongoing fair use and legal efforts around software preservation.
- Building local coalitions of interested researchers, hobbyists, and students around software preservation, digital materials, and emulation to gain a better understanding of research interests and needs. FCOP cohort members at the University of Arizona and Georgia Tech provide outstanding examples of building interest and mission driven groups to support, influence, and sustain their work.

User experience and testing proved to be integral components of our work during the FCOP grant period. Exploring and researching how software and software-dependent digital materials in emulated environments are discovered, explored, and understood by users is an area that needs continued coordinated research in the archival and library communities and can ultimately strengthen preservation strategy. We recommend the following actions at UVA:

Use the Sheeran Architects collection as an opportunity to take a structured, planned approach to archival user experience testing for digital materials in the reading room: Feedback for born digital materials and emulated environments in the reading room environment by students, staff, and researchers will allow us to better our preservation and processing workflows, and can be expanded to additional collections as work continues.

- Coordinate with cohort members, the digital stewardship community, and/or other researchers to openly share results, protocols, and attempts to reproduce or test user experience in differing local environments.
- Plan for remote reading room experience testing.

Next steps for our specific grant work in this area includes:

- Collaborating with user experience at UVA to develop user testing protocols for the Sheeran collection in the reading room. (Short-term)
- Continuing to collaborate with cohort and digital preservation and archives community members around similar shared user experience research efforts. (Middle-term)
- Continue to plan UVA community inreach and outreach efforts to build archival and library community interests and input into research. (Middle-long term)

Appendix A: Timeline, Presentations and Outreach Materials

2020

March
Lauren and Elizabeth take part in the Code4Lib FCoP cohort presentation

February
Lauren, Chip German, and Chrisitian Dahlhausen write the UVA EaaSI node reflection post

Lauren helps lead an IIPC day long workshop on software preservation

2019

November
Lauren leads user exploration of emulation environment World Digital Preservation Day at UVA

October
SPN EaaSI webinars: Lauren on Episode 4: Emulators and Configuration Workflows

Elizabeth sends a summary of the Emulation in the Archives workshop to the *Mid-Atlantic Archivist*, vol. 48, no. 4 where it was included in the *Caucus News* section.

September
Recap of Emulation in the Archives workshop written by Brenna Edwards for SAA's Electronic Records Section

August

UVA Team hosts Dr. Amelia Acker, SPN researcher for a 2 day visit and observation of our work

Lauren and FCOP colleague Tracy Popp pop-up SAA presentation: "How does it *really* work? Software Preservation and Emulation in the Archives"

Lauren helps lead with SAA day long workshop on "Multi-threading software preservation and emulation"

July
Emulation in the Archives free workshop hosted at UVA
All materials are openly available via OSF: https://osf.io/mtf4u/

May

Lauren presents on SPN FCOP/EaaSI work for the AP Trust Spring Member meeting

March
SPN Legal webinars: Lauren on Episode 4: Working with Source Code and Software Licenses

2018

August:
Lauren attends SPN FCOP cohort kickoff meeting in San Jose, CA