

# Catalyst Fund Proposal

<b>Proposal Title:</b>	Advancing 3D Digitization and Metadata Conventions
<b>ID:</b>	16
<b>Institution:</b>	<b>IUPUI University Library</b>
<b>Requestor:</b>	Kristi Palmer, Associate Dean of Digital Scholarship
<b>Budget:</b>	\$29,500
<b>Goal (as pulled from the application):</b>	<p>“The main objective of this project is to pilot 3D digitization and metadata conventions by: 1) Digitizing and describing objects of varying colors, shapes and sizes, with a variety of intended audiences 2) Documenting those processes 3) Establishing preliminary standards and workflows 4) Testing those preliminary standards and workflows and 5) Nationally vetting those preliminary standards. This work will underpin the beginnings of standardization of digital collections of library, museum, and archive 3D artifacts on a national scale.”</p>
<b>Description:</b>	<p>The lead applicant organization for this project is Indiana University Purdue University Indianapolis (IUPUI) University Library. Funds in the amount of \$29,500 are requested, with the same amount provided by partnering organizations including: the Indianapolis Motor Speedway Museum, the Conner Prairie Living History Museum, and the Benjamin Harrison Presidential Site. The main objective of this project is to pilot 3D digitization and metadata conventions by: 1) Digitizing and describing objects of varying colors, shapes and sizes, with a variety of intended audiences 2) Documenting those processes 3) Establishing preliminary standards and workflows 4) Testing those preliminary standards and workflows and 5) Nationally vetting those preliminary standards. This work will underpin the beginnings of standardization of digital collections of library, museum, and archive 3D artifacts on a national scale.</p> <p>Statement of Need: Digitizing collections has become a standard practice for libraries, museums, and archives. These collections include flat objects, photographs, negatives, microfilm, audio and video materials. Utilizing established workflows and best practices, these collections are easily accessible through content management systems and shareable through standardized metadata and exchange protocols, exemplified by the success of the Digital Public Library of America (DPLA). While the digitization of 2D objects continues, affordable 3D technologies are advancing opportunities for the same institutions to consider including 3D objects in their digital collections. The combination of low-cost cameras, new laser-based scanning systems, the computational power needed to process large quantities of capture data, and the sufficient penetration of broadband Internet access has made the adoption of 3D technologies feasible for cultural heritage digitization activities (Hess, 2015B Robson et al., 2012).</p> <p>While 3D technologies have been used in such fields as: Forensics professions scanning crime scene evidence without disrupting the scene (Joshi, 1) Bioengineering/Medical applications for reconstructive surgery purposes Geologists surveying landslide activity (Pan, 1) Digital gaming and Archaeological site scans for ancient cities and their artifacts (Ahmed, 2), there is no comprehensive documentation of usage or path towards standardized guidance for culture heritage</p>

supporting professions. Over the past three years, two surveys, one national (Urban, 2015) and one international (Hess, 2015) have been conducted regarding the use of 3D imaging and user requirements in cultural heritage institutions. Based on survey results, it is clear that utilizing 3D technologies in libraries, museums and archives is in its infancy. Hess's survey points towards usage possibilities (ability to remotely measure true size of objects) and desired user requirements (easy online viewing and navigation) yet there is no comprehensive understanding of what constitutes 3D image quality and description for exchange, preservation, and access of digital artifacts (Hess, 2015). In 2000, Anne R. Kenney and Oya Y. Rieger with Moving Theory into Practice: Digital Imaging for Libraries and Archive developed a much needed and widely implemented guide for 2D object digitization and description. This work paved the way for wide-spread digital collection creation in cultural heritage institutions across the nation. It became the cornerstone for refinement of more specific digital collection standards and provided a checklist for funding agencies desirous of supporting public access to unique and important collections through digitization but reticent to feel those funds were supporting "one offs." The primary objective of the project proposed here is to move towards a like basis of standards for scanned 3D artifacts. Project Design: IUPUI University Library has been working with local libraries, museums, and archives since 2006 to create digital libraries for 2D collections. Like many other urban university libraries and city public libraries, University Library's mission is rooted in community collaboration and civic engagement. University Library has developed a statewide reputation for partnering with local cultural heritage entities who have unique collections but no means by which to make them widely accessible. To date, the Library has collaborated with over 30 Indiana institutions and provides access to over 80 digital collections. In 2015, several partnering institutions began inquiring about 3D artifact implementation into their collections, giving the Library the opportunity to explore 3D scanners, hardware, and software. After finding little guidance in the literature regarding 3D technologies for cultural heritage digital libraries, the librarians sought experts in the manufacturing industry that have been utilizing 3D scanning technologies for the past 25 years to guide the path to purchase scanners. After thoughtful consideration, and internal grant funding through the IUPUI Arts and Humanities Institute, the library purchased Creiform's Go!Scan 3D portable, hand-held white light (LED) scanners (Go!Scan 20 and Go!Scan 50). These scanners provide high levels of accuracy and the resolution needed to create master files that can then be repurposed for derivative works. The librarians are working with a variety of partners including: Indiana University School of Informatics faculty whose research interests include 3D digitization, 3D printing, and the use of augmented reality for education purposes and Established community museum partners to guide our testing and outcome directives. Partner institutions will provide access to artifacts, content for metadata creation, and a testing audience for preliminary standards for scanning, workflow protocols, and metadata.

The library and partners will achieve the project goal by completing the following tasks: 1) Digitize varying objects of color, shapes, sizes, and textures 2) Develop and test a set of preliminary conventions for scanning processes and post-processing workflows by identifying usable file formats, determining a protocol of aligning scan

data, and refining various polygon level data (original scan, film/animation quality, video gaming, and augmented/virtual reality derivatives . 3) Develop and test a descriptive metadata protocol for these objects with a variety of uses (discovery, preservation, etc.) and audiences in mind 4) Fully document the processes and decisions made for digitization and description, and 5) Develop a suggested set of scanning, processing, and description standards for national peer review and feedback through open peer review/commenting utilizing CommentPress and presentations at national forums of experts such as Lyrasis webinars and in-person meetings such as Digital Library Federation, American Library Association, and DPLA Fest.

Funding for one of these forums is presently under consideration by the Institute for Museum and Library Services. Led by Virginia Tech in collaboration with Indiana University/IUPUI and University of Oklahoma, the project proposes to organize a National Forum to develop a roadmap and white paper for library adoption of 3D and Virtual Reality (VR) services to support new ways of interacting with digital content. A team of up to fifty-seven researchers, practitioners, and other leaders in imaging science and engineering, digital preservation, and digital libraries will participate in our National Forum to advance knowledge in archival and curation challenges in 3D/VR collections. The standards we develop through this Lyrasis grant will be an integral part of this Forum conversation.

National Impact: It is evident through surveys and the lack of literature documenting 3D technologies that while there are clear technological possibilities for the creation of 3D cultural artifacts for analysis, research, and usage for exhibition display and education, there is no clear path for the establishment of 3D conventions that are available to guide the successful implementation of 3D artifacts into a digital library collection. Pilot scanning projects have already informed how practitioners can more efficiently and systematically conduct scanning. For example early testing shows that highly reflective and translucent materials, like those found in ornate costuming, cannot be scanned with white light (LED) scanners. Image processing post scan requires significant computing time and necessitates a second processing dedicated machine. It is these sorts of early discoveries that will be a part of our suggested standards. IUPUI University Library has already invested in the hardware and software necessary to begin testing workflows and best practices for digitizing varying artifacts held by cultural institutions. Building upon this recent investment, 15 years of experience with 2D digitization standard development and implementation, and already long established relationships with community organizations, public and special libraries, museums, and archives, IUPUI University Library is uniquely positioned to initiate this important work.

Budget: We request \$29,500 to support half the cost of a one-year, full-time 3D Technology Project Coordinator.

Several funding streams have already been secured to begin the work of this project. Mentioned above was \$30,000 from the IUPUI Arts and Humanities for scanner purchase, a promised match of \$29,500 from the Benjamin Harrison Presidential Site who has already received funding from the R.B. Annis Educational

	<p>Foundation, and a presently proposed IMLS Grant to support a National Forum. What we seek through the Lyrasis funding opportunity is half the funding for a one-year, full-time 3D Technology Project Coordinator with a salary of \$42,000 plus 40.23 % benefits totaling \$58,897.</p> <p>This position is crucial to the timely completion of the entire workflow processing and testing that must be accomplished prior to a pilot draft set of standards being vetted at a national forum. The 3D Technology Project Coordinator will manage off-site 3D scanning operations create and refine 3D scanning processes and workflows supervise 1-3 student digitization assistants be responsible for the quality control of scanned items including post-processing, and technical and descriptive metadata. The Digital Scholarship Librarian presently coordinating this work is also the individual who will lead the standard drafting. The addition of the 3D Technology Project Coordinator would allow the Digital Scholarship Librarian to focus more fully on standards creation.</p>
<p><b>Comments from Field Reviewers:</b></p>	<ol style="list-style-type: none"> <li data-bbox="406 762 1430 871">1. If I read the proposal correctly. I think making progress and broadly sharing the work on 3D digitization, metadata and access is an excellent project if done collaboratively.</li> <li data-bbox="406 871 1430 1266">2. As digitization moves into 3D for an increasing number of libraries and museums, the timing is right for a project to get workflows and metadata standards under control before the practice expands. Getting ahead of an explosion of 3D resources with variable standards is necessary and innovative. Some additional information I was hoping to see included more discussion of evaluation throughout the development of these standards, including how many institutions would have input beyond the partners, the types of institutions, how those institutions would be contacted, and how that feedback would be implemented. While there are several partners, greater diversity and greater numbers of institutions to provide feedback and help guide workflow and types of metadata would be essential.</li> <li data-bbox="406 1266 1430 1549">3. Yes -- documentation of creating and publishing 3d scans is desperately needed, especially as costs of the scanners continue to go down in price. Librarians and museums should be the leaders in developing the best practices and methods for creating these objects as they have experience in thinking beyond the immediate use and application of technology innovations. Giving archives and museums guidance on scanning and describing 3d objects in their collections will only aid scholarship across the world, making local collections more accessible without travel needed.</li> <li data-bbox="406 1549 1430 1694">4. In a funny way, this project is not particularly innovative - we've been creating standards forever. The subject matter, though, pushes this to the top - 3D imaging is happening all over, and these guidelines and standards will be put to good use the minute they're complete.</li> </ol>