

***Developing Library Strategy for 3D and Virtual Reality Collection Development and Reuse***  
*Virginia Tech (VT), Indiana University (IU) and the University of Oklahoma (OU)*

**1. Statement of National Need** — A team led by Virginia Tech (VT), in collaboration with Indiana University (IU), and University of Oklahoma (OU) request \$98,185, with \$36,027 cost-share, 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. 3D and VR technologies show great promise for a range of scholarly fields as they offer new potential for interactive visualization and analysis of artifacts, spaces, and data. Scientists for example can make more inferences from 3D digital models than from photos, while humanists can visually represent texts, images, and material artifacts in VR spaces to contextualize their relevance. Lower costs and greater computational power have made 3D and VR technologies financially realistic for a broader variety of institutions. As a result, sustainable programs and infrastructure for access and management of 3D and VR data are now vital (Rowe & Frank, 2011). Many academic libraries have developed archives for other forms of research data, but there is an absence of standards and practices for producing, managing, and preserving 3D and VR content. This gap is essentially an information management problem suited to the strengths of libraries.

**2. Project Design** — We will convene a team of up to fifty-seven researchers, practitioners, and other leaders in imaging science and engineering, digital preservation, and digital libraries to participate in our National Forum to advance knowledge in archival and curation challenges in 3D/VR collections. We will hold three national forums on different themes (below) in different regional locales. Core team staff with relevant experience from partner institutions will attend each forum along with expert practitioners, industry representatives, and those selected from a national call to participate. Participants at these forums will develop a roadmap and white paper for library adoption of 3D and VR services to support new ways of interacting with digital content. Participants will prepare in advance with a common set of readings and case studies. Core team staff and an advisory board will develop a template with key questions for the forum to address. Each meeting will follow an open space forum format (Owen, 2008) focusing on specific questions pertinent to the meeting themes to address the key outcomes for our white paper and roadmap. Follow-up work will include organization and synthesis of findings from the forums. We are also coordinating with another proposed IMLS NLG Forum Project entitled "Community standards for 3D data preservation (CS3DP)" led by Jennifer Moore (Moore, 2017). They will have formal representation at our forum and we will share our high level roadmap with this team as they explore more granular levels of 3D object preservation.

***Meeting Theme A: Content Creation and Publishing***

Attendees will study 3D/VR digitization projects from public, private, and liberal arts institutions, as well as public libraries. Attendees will analyze 3D and VR requirements for production and dissemination, and how to leverage resources such as Open Science Framework, Figshare, as well as open source and vendor-supplied options for storage, access, and management.

***Meeting Theme B: Repository Practice and Standards***

Attendees will study the feasibility to support 3D/VR within national preservation efforts such as APTrust and DPN, while closely examining the policies and practices of several strongly developed institutionally based repositories. National and international standards will inform the basis for best practices.

***Meeting Theme C: Visualization and Analysis***

Attendees will study integration of 3D/VR into teaching, research and outreach. Topics will include hardware and software design for establishing robust 3D/VR tools that provide scholarly access to 3D data produced via expert modeling techniques, workflows, and abstract or numerical data sets (e.g. weather data). Existing 3D/VR workstations developed by OU Libraries will provide a case study and launching point for discussion. Participants will also study interoperability of various 3D/VR platforms (mobile vs. web-based). To advance public outreach and impact, OU Libraries will host a public forum immediately preceding the expert IMLS forum in which initial findings from meetings A and B can be presented to invited local partners. The public forum will also include a focus group to identify challenges to implementing standards and best practices for

smaller cultural heritage institutions. This will broaden our outreach as well as ensure that the findings are practicable for the needs of institutions with varying scales of funding and resources.

**3. Project Directors, Key Personnel, and Partners** — Project leads will include librarians and faculty at VT, IU (Bloomington and Indianapolis), and OU. Nathan Hall (VT), will lead the overall project and serve as project director for the proposal with coordinating duties across all meeting sites. Zhiwu Xie and Andi Ogier (VT) will provide expert advice on cyber-infrastructure in support of 3D and VR collections and will support Hall with Meeting A in Washington, DC. Co-PI(s) Jennifer Laherty, Julie Hardesty and Robert H. McDonald, along with Sr. Personnel Jennifer Johnson (IU) will lead subcontract work at and manage Meeting B located in Rosemont, IL., and will offer guidance on 3D specimens (biological sciences), 3D/VR metadata standards, support commercial stakeholder interaction, and scanning methods specific to the IU Imago repository (Indiana University, 2017). Matt Cook, Zachariah Lischer-Kats, and Tara Carlisle (OU), will provide expertise on the development of custom VR platforms, strategic faculty partnerships for VR course integrations, and research applications, expertise on 3D research data and will manage forum Meeting C in Norman, OK.

**4. Relevance to National Digital Platform** — This forum contributes to the National Digital Platform by expanding digital capability and capacity of libraries across the U.S. through developing a high-level roadmap for use and integration of 3D and VR collections and technologies within the modern library eco-system (repository collection development, data management, data publishing, teaching and learning). In order to improve the sustainability and broaden the applicability of 3D and VR modeling tools, we are drawing our national forum participants from experts in digital technologies, as well as cutting-edge scientists and humanists. Collectively, this team leverages and benefits from current best practices and future technology investments to create a roadmap for library engagement in 3D and VR development, collection, preservation, and use. Through the white paper and roadmap this expert group will identify the required combination of software applications, social and technical infrastructure, and staff expertise required to integrate 3D/VR technologies and collections into library services, thereby improving interoperability, usability, and user community involvement in 3D/VR in U.S. libraries.

**5. Potential Impacts** — The Forum will concentrate and advance knowledge and best practices for 3D and VR technologies in libraries. We will produce an open access white paper organized into sections corresponding with the meeting themes described above. We will disseminate this document through relevant association listservs and high-impact conferences and journals for information professionals and disciplinary research scientists. The findings will allow libraries to strategically pursue 3D image and VR programs, and allow academic and public library users new ways of interacting with digital content.

**6. Performance Goals and Outcomes** — Within the agency-level goal of Learning, we are addressing the Support Communities of Practice performance goal. Our forum will develop a white paper and roadmap that recommends practices for in-house 3D/VR imaging programs including production, cost-modeling, visualization, access, and preservation for future use. All participants in our three regional expert meetings and select members of our dissemination presentations will take a Qualtrics survey in order for the team to gather quantitative user data outcomes of our learning-based community of practice.

**7. Budget** — We request from IMLS a total budget of \$98,185 over a 12-month period (October 1, 2017 - September 30, 2018) with \$36,027 as cost-share. This includes \$85,214 direct cost and \$12,971 indirect cost, calculated at VT's negotiated rate of 22.5%. Direct costs include \$29,939 for VT, \$31,965 for IU's subcontract, and \$23,310 OU's subcontract. Subcontracts include travel, salaries, fringe, and indirect costs. VT's portion consists of \$20,600 for travel, \$2,188 for salaries, for \$771 for fringe, \$12,971 for indirect costs, and \$2,500 for additional travel for the PD. Each institution contributes additional cost-share to the grant: \$10,746 for VT, \$17,482 for IU, and \$7,799 for OU. Travel costs at all sites include transportation, lodging, catering, and facilities for forum participants.