



INSTITUTE of
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SERVICES



NDP at Three

The First Three Years of IMLS Investments to Enhance
the National Digital Platform for Libraries

SEPTEMBER 2017

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REPORT ON THE NATIONAL DIGITAL PLATFORM, 2015-2017

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Over the past several years, the Institute of Museum and Library Services (IMLS) has worked with diverse stakeholder groups to establish the National Digital Platform (NDP) as a framework for investments in digital infrastructures for libraries. The NDP represents the combination of software applications, social and technical infrastructures, and staff expertise that provide digital content, collections, and services to all library and archives users. As libraries and archives increasingly preserve and provide access to digital information, they are seeing more opportunities to collaborate with each other around the tools and services they employ to meet user needs. Key elements of NDP work include developing and sustaining shared infrastructures, as well as ensuring those tools, services, and systems exemplify library principles and values.

The NDP functions as a broad framework for understanding the resources that support digital library infrastructures across the country. Through the National Leadership Grants for Libraries Program (NLG) and the Laura Bush 21st Century Librarian Program (LB21), IMLS has now completed three years of grant-making designed to provide catalytic improvements to digital infrastructures for libraries and archives, as well as the education and training necessary to support them. The NLG program supports NDP-related work addressing substantial challenges in library and archival practice, including research, planning, and software and service development. The LB21 program funds education and training activities to ensure a diverse workforce of librarians is equipped to lead digital initiatives.

During Fiscal Years 2015 to 2017, the IMLS Office of Library Services (OLS) awarded 111 competitive grants and invested over \$33 million in projects related to the NDP framework. The funded work ranged from smaller planning, prototyping, and national forum projects, to large digital infrastructure and research grants. The purpose of this report is to share the NDP-related work that IMLS has funded to date and synthesize emergent themes from these awards.

This introduction provides background and context on the development of the NDP framework and the cross-cutting principles involved in these projects. Next, the report outlines three focal areas that emerged: 1) building equitable digital communities, 2) expanding digital cultural heritage capacities, and 3) opening scholarly communications. The report then includes sections for each focal area, providing in-depth discussion of key themes and emerging areas of work. The appendix is organized by focal area and provides

a summary of each funded project. This report is not intended as a summative evaluation of the NDP framework. Rather, it is a snapshot intended to provide insight into how this portfolio of awards is developing.

The review process IMLS uses for competitive grant-making ensures that projects funded by the agency represent the best and strongest ideas and partnerships for advancing digital tools and services across libraries in the United States. It involves reviewers from diverse cross-sections of subject matter expertise in libraries and library science education. The emerging themes in the NDP grant portfolio offer significant insight into the present and future of digital library services throughout the nation.

Establishing the National Digital Platform

IMLS's enabling legislation (20 U.S.C. 9101 *et seq.*) institutes a key role for the agency in supporting both the development of national information infrastructures and library workforces to make use of those infrastructures. IMLS has funded work to improve digital infrastructures for libraries through its competitive grant programs throughout its 20-year history. For example, from 2005 to 2013, the "advancing digital resources" category of the NLG program invested \$30 million in the development of digital resources across the nation.

IMLS competitive awards are complemented each year by the Grants to States component of the Library Services Technology Act (LSTA). The Grants to States component of IMLS funding is outside the scope of this report, which focuses on the NLG and LB21 competitive grant programs, but it should be noted that those nation-wide efforts are often intertwined with the development and execution of NLG and LB21 awards.

In April 2014, IMLS convened representatives of diverse stakeholder communities to discuss national priorities, needs, and the future of this kind of work. Participants emerged committed to a more strategic approach to the development of shared digital tools and services around the country. As a result, IMLS established the NDP as the framework for future competitive grant funding for digital library initiatives, and designated the NDP an explicit funding area in the NLG and LB21 grant programs.

In April 2015, the IMLS OLS again convened stakeholders from across diverse library and archives communities to explore ways to better focus digital library funding.

A series of key principles emerged from this meeting, which are evident across all areas of NDP-supported work:

- **From Innovation to Impact:** A desire for “innovation” in new digital library services during the early 2000s led to fragmentation, resulting in the development of many novel tools with few users. Instead of focusing on innovation, the NDP reflects efforts to develop shared, complementary resources that build from existing foundations.
- **Diversity and Inclusion:** NDP work must be inclusive of the diverse communities and sovereign tribal nations that make up the United States.
- **Radical and Systemic Collaboration:** A core component of the NDP is to advance library services through collaboration. This includes breaking down expertise and work silos inside and across institutions, and establishing cross-sector partnerships that engage with other civic, social, and learning institutions.
- **Decentralization and Interoperability:** Work in the NDP is focused not on singular or monolithic systems, but instead on collaborative, coordinated efforts to develop tools and services that rely on the increased cooperation of libraries across the country. Interoperability and modularity are essential to this work, ensuring that the whole becomes more than the sum of the parts.
- **Continuous Learning in the Digital Library Workforce:** NDP work is not only technical, rather it also depends on the expertise of the professional librarians and archivists who develop, maintain, and use digital tools and services. Given the increasing pace of change in the field, it is key that work in NDP focal areas supports the education and training of librarians to lead the way in the design, development, implementation, and maintenance of digital tools and services.
- **Technologies as Enabling Mechanisms:** Emerging and maturing technologies and approaches are useful and valuable only to the extent they complement and expand institutional abilities to serve users.

As a result of these continuing conversations and dialogue among those in the field, two core axioms emerged that are present across the various projects and focal areas in this report: 1) libraries should collaborate on shared tools, services, and digital approaches to successfully meet user needs; and 2) these collaborations and shared infrastructures will only be valuable to

the extent they are anchored in library and archival principles.

Focal Areas

During the first three years of NDP-focused IMLS awards, three portfolio focal areas emerged: building equitable digital communities, expanding digital cultural heritage capacities, and opening scholarly communications.

Building Equitable Digital Communities

As digital equity institutions, libraries increasingly play key roles in local communities. In this respect, libraries (public libraries in particular) provide essential resources and services to improve daily life for people of all ages. This work builds and advances the principles for access and adoption outlined in the 2012 IMLS report *Building Digital Communities: A Framework for Action*. IMLS-funded work in this focal area supports the full range of social and civic functions libraries play in their communities, including but not limited to: education, economic and workforce development, civic engagement, public safety and emergency services, health information, and social connections. Projects in this area also help to expand digital inclusion, broadband access, and digital literacy.

**NDP Dollar Amounts by Focal Area
FY2015-FY2017**

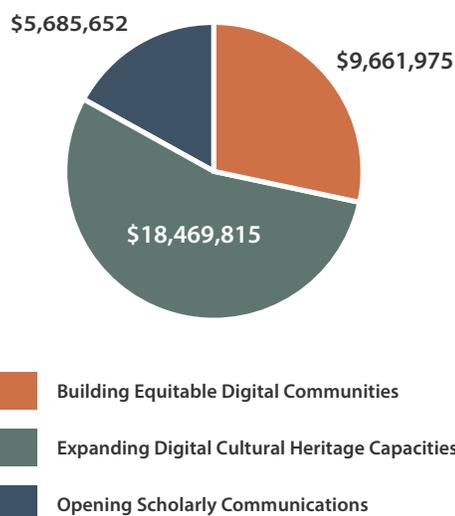


Figure 1. National digital platform grant funding divided into three focal areas. This figure includes grants awarded through the National Leadership Grants for Libraries Program and the Laura Bush 21st Century Librarian Program.

Expanding Digital Cultural Heritage Capacities

Libraries and archives are essential to preserving and providing access to the cultural record. New technologies, including those developed in libraries, have led to significant opportunities for libraries to collect, preserve, provide access to, and enable use of cultural collections. The complexity and amount of digital content managed by libraries continues to increase dramatically. Work supported by IMLS in this focal area often involves enhancing tools, services, and practices to expand the capacities of libraries and archives as memory institutions. A common goal of projects in this area is making collections as widely usable as possible while respecting intellectual property restrictions and cultural sensitivities.

Opening Scholarly Communications

Libraries play an increasingly critical and central role in the production and dissemination of knowledge. The opening scholarly communications focal area emphasizes building, revamping, and training for the social and technical infrastructures necessary to support research and scholarly communication. Scholarly communications may include any data or deliverable developed at any point during the research life cycle. Efforts to increase the accessibility and preservation of resources frequently reflect themes related to work in areas including open source software, open science, open scholarship, and open data.

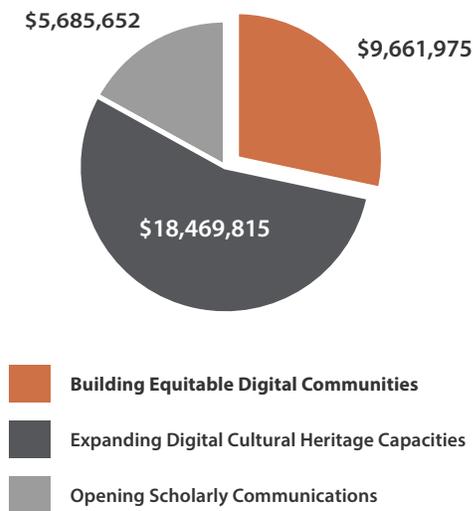
Libraries in the United States have a long history as trusted stewards of information resources. An essential aspect of these services is that they are available to everyone. The American Library Association views equity of access as the state in which individuals possess the information they need, without regard to “age, education, ethnicity, language, income, physical limitations or geographic barriers.” Equity of access also implies that people should be able to acquire information in multiple formats including electronic and print. This history of libraries as equitable institutions continues today through the principle of “digital inclusion.”

Digital inclusion is a term for the concept that all individuals and communities should be afforded broad and open access to and use of computers, mobile devices, and the Internet. In addition to access, an underlying principle of digital inclusion is that individuals and communities require the knowledge, skills, background content, and technical support services necessary to make productive use of these technologies. The goal of digital inclusion is to transcend and obliterate historical, institutional, and structural barriers to the access and use of technology.

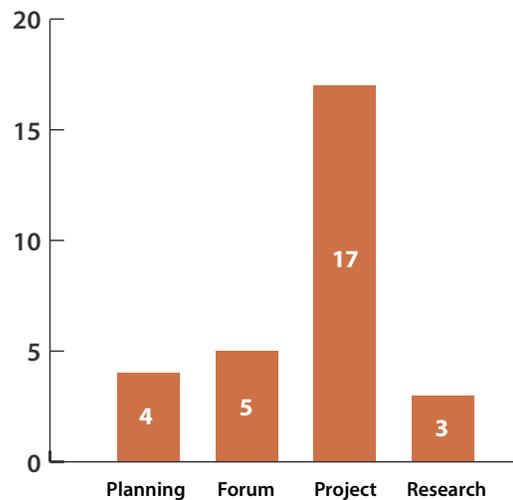
As noted in the introduction, in 2012, IMLS published Building Digital Communities: A Framework for Action. In addition to this publication, IMLS has an extended history of supporting the evolving role of libraries as centers for technological access. As technologies continue to advance, the necessity of digital access and literacy continues to further permeate the daily lives of individuals throughout the United States. *Building Digital Communities* serves as a roadmap for continuing the work of building digital infrastructures and broadening digital inclusion throughout our communities.

NDP awards in this focal area have underscored the vital roles that libraries play in terms of equity of access and digital inclusion around the country. Libraries are recognized community anchors with the capacity to convene leaders in governments, businesses, schools, hospitals, and cultural institutions to enable them to work together to fully and effectively realize the value of a digital community. Libraries have grown to serve their communities using digital technologies and offering tools and services in economic and workforce development, education, healthcare, public safety and emergency services, civic engagement, and social connections. The ways libraries are bridging gaps to

**NDP Dollar Amounts by Focal Area
FY2015-FY2017**



**Building Equitable Digital Communities
FY2015-FY2017 (\$9,661,975)**



Figures 2 and 3. The building equitable digital communities focal area from FY2015 - FY2017, including grants awarded through the National Leadership Grants for Libraries Program and the Laura Bush 21st Century Librarian Program. Figure 2 shows the total funding for this focal area within the larger NDP portfolio. Figure 3 shows all grants in this focal area (n = 29) by funding category.

digital inclusion have only continued to broaden.

Several other organizations are also funding innovative ways to assist libraries with digital services by making access to technology more inclusive. These include the John S. and James L. Knight Foundation, the William and Flora Hewlett Foundation, the Benton Foundation, and the Bill and Melinda Gates Foundation.

Overview of Funded Projects

The first three years of NDP projects in the building equitable digital communities focal area include \$4,739,421 in NLG awards and \$4,922,554 in LB21 awards, for a total of \$9,661,975. This includes four planning grants, five national forum grants, seventeen project grants and three research grants.

Project Themes

Themes of projects in the building equitable digital communities focal area include: expanding broadband access and connectivity, facilitating library support of open educational resources (OER), and broadening access to eBooks. These themes are related to the broader concept of digital inclusion because they are each based on helping communities participate in the global economy and working toward improving civic life.

Expanding Broadband Access and Connectivity

Internet access and literacy are essential for many aspects of living, working, and learning. The content and services provided through the NDP and discussed in this document are only useful to communities and individuals who have reliable and robust web connectivity. However, in the U.S., there remain large and significant populations without high-speed Internet access. Connectivity, therefore, is a critical equity issue, and one for which libraries have had a long history of leadership. In many communities, libraries play important roles as the only sources of access to technologies and digital content. Over the past three years, several IMLS-funded grants have focused on expansive approaches to enabling Internet access, which is a base level requirement for digital inclusion.

- *Libraries Leading in Digital Inclusion and Disaster Response via TV WhiteSpace Wireless Connections* ([LG-70-16-0114-16](#)), San Jose State University, \$249,999
- *Redesigning State-Level E-Rate Support* ([RE-00-15-0111-15](#)), Chief Officers of State Library Agencies (COSLA), \$95,200

- *Toward Gigabit Libraries* ([RE-00-15-0110-15](#)), Internet2, \$248,725

Enabling Library Support of Open Educational Resources (OER)

There are a growing number of teaching, learning, and research materials in the public domain, as well as materials that have been released using open intellectual property licenses. Such educational resources can include full courses, class materials, modules, textbooks, streaming videos, exams, and software. These digitally accessible learning materials, referred to as Open Educational Resources (OER), can be used by teachers and students in both formal and informal learning settings.

However, as the amount and quality of digital educational resources continues to grow, the value of these resources can be entirely undercut when potential users are unable to access the resources because of a lack of internet access or digital literacy. IMLS-funded grants address some of the fundamental concerns in this area, including the cost and quality of learning materials for undergraduate curriculums, the role of OER development by librarians in the context of K-12 teaching and learning, and the development of OER for digital and web literacy. IMLS supports projects that allow libraries and librarians to be promoters, advocates, and stewards of the use, reuse, adaptation, and sharing of OER.

- *Digital Skills for Digital Librarians* ([RE-00-15-0105-15](#)), Mozilla Foundation, \$808,601
- *Exploring OER Curation And The Role of School Librarians* ([LG-86-17-0035-17](#)), Institute for the Study of Knowledge Management in Education (ISKME), \$475,278
- *Developing Open Education Leaders for 21st Century Libraries* ([RE-70-17-0073-17](#)), University of Minnesota, \$247,912

Broadening Access to eBooks

Digital inclusion is about more than connectivity; it is also about ensuring there is meaningful, accessible, and usable content available to users through that connectivity. Through the NDP framework, IMLS supports projects that improve "e-content," often including eBook borrowing capacities for libraries. Several recent NDP grants are related to eBooks and seek to unify and improve the eBook borrowing and reading experience for library users across the country. As libraries increasingly take control of developing and maintaining this infrastructure, they are ensuring that it is cost effective, lives up to the principles of accessibility,

and can best make use of openly licensed content.

- *Library E-Content Access Project (LEAP)* ([LG-00-15-0263-15](#)), New York Public Library, \$1,372,154
- *SimplyE for Consortia: Three Clicks for All Your Ebooks* ([LG-70-16-0010-16](#)), University of Minnesota, \$695,000

Emerging areas

Technologies and digital ecosystems continue to adapt at such a rate that it is incumbent upon library systems to continually foster agile, adaptable, and sustainable tools, services, and workforces. This atmosphere is necessary to meet the continually growing and diverging information needs of the communities libraries serve, particularly in terms of public access to technology.

Universal Design in Digital Library Systems

IMLS has long supported libraries in creating and maintaining tools and services aimed at raising awareness and educating for the use of digital knowledge resources. However, the practice of making information resources accessible and usable is one that continues to change and grow as information contexts expand.

Recently, a number of NDP projects have addressed developing and sustaining infrastructures that increase the accessibility of course materials for all users. In particular, recently funded projects have focused on usability and utility for people with significant vision loss. Through this work, there is an increased focus on the principles of universal design and the mainstreaming of accessibility as a core component in the development of all digital library tools and services.

- *Creating Digital Library (DL) Design Guidelines on Accessibility, Usability And Utility for Blind and Visually Impaired (BVI) Users* ([LG-70-16-0038-16](#)), University of Wisconsin, \$495,600
- *Repository Services for Accessible Course Content* ([LG-72-15-0009-15](#)), Tufts University, \$49,870

Public Data and Civic Engagement

Libraries often serve as community anchors; they serve as an ideal space for citizens around the country to interact with local, state, and federal governments, as well as private sector and nonprofit organizations. In particular, public libraries are uniquely positioned as locations where the public can come to better understand and learn to make use of data collected about their communities. Through NDP funding, IMLS has recently supported grants that support this type of

civic engagement, often making use of open, public data.

- *Design and Evaluation of a "Digital Transparency Platform" for Advancing Legislative and Regulatory Transparency* ([LG-72-17-0078-17](#)), University of Georgia, \$49,839
- *Open Data for Public Good: Data Literacy Education for Public Information Professionals* ([RE-40-16-0015-16](#)), University of Washington, \$690,858
- *Developing Public and Academic Libraries as Key Participants in Civic Open Data Ecosystem* ([LG-70-17-0146-17](#)), University of Pittsburgh, \$224,761

Understanding Data Literacy, Library Values, and User Privacy

In a digital world, the concepts of literacy, library values, and user privacy and security have taken on a multitude of meanings and implications. Within this context, issues for librarians include privacy by design, internal library information systems, third-party library software systems, as well as cloud-based library systems. From a public service and library user perspective, there are privacy and security concerns regarding public internet and Wi-Fi services, licensing of digital content, data security, government information requests, and social media strategies. NDP awards have enabled librarians to promote digital privacy and data literacy for library users as well as provide advanced educational opportunities for librarians.

- *Library Values & Privacy in our National Digital Strategies: Field guides, Convenings, and Conversations* ([LG-73-17-0062-17](#)), University of Wisconsin, \$90,150
- *Scaling Digital Privacy & Data Literacy in Libraries* ([RE-06-15-0050-15](#)), Brooklyn Public Library, \$240,729
- *Privacy in Libraries* ([RE-95-17-0076-17](#)), New York University, \$249,504

Libraries have long served as stewards of cultural heritage by organizing, preserving, and providing access to records of all types. Increasingly, libraries must manage vast quantities of digital content alongside their physical collections. This evolution has posed significant challenges, but also great opportunities for increased access to, and use of, cultural heritage collections.

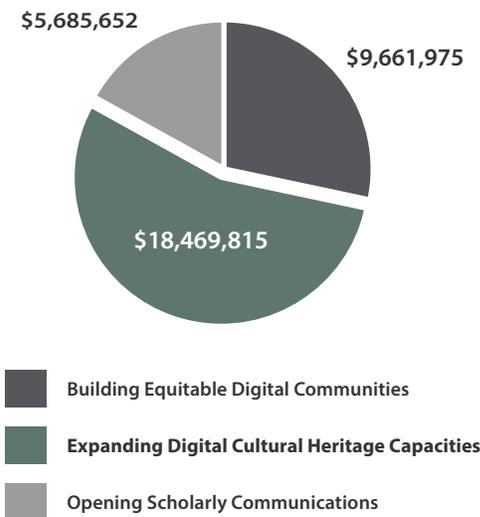
Increasing access to digital cultural heritage has been a core focus of IMLS funding for much of the agency’s history. From 2005 to 2013, the “advancing digital resources” (ADR) category of the NLG program, described in the introduction to this report, supported foundational work in digital cultural heritage. ADR grants supported work including repository development, creation of digital collections, and digital preservation. These projects generated a shared baseline for digital cultural heritage work at institutions across the U.S. and helped establish digital services as a core component of the work of libraries and archives.

The NDP naturally evolved from ADR as a response to the consensus arising from the 2014 and 2015 convenings and the field wide need for tools and services to manage digital content. The emergence and

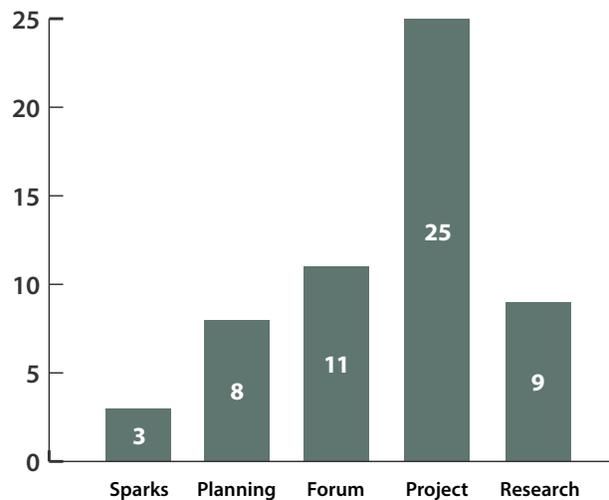
proliferation of more complex digital content types and the explosion in the quantity of digital content continue to pose real concerns for institutions seeking to capture, curate, and preserve content. As stated in the [2015 National Agenda for Digital Stewardship](#), “the challenge of digital stewardship is the challenge of managing this massively increasing volume of... digital content at scale.” With the transition from ADR to NDP, IMLS focused its digital cultural heritage funding on projects to develop shared infrastructures, tools, and services, rather than projects related to a specific collection or set of collections.

After three years of NDP funding, IMLS has made significant national investments in digital cultural heritage work. In addition to supporting the development and enhancement of infrastructures and tools through NLG, funding through the LB21 program has catalyzed new approaches to continuing education and professional development. Projects such as the several National Digital Stewardship Residency (NDSR) cohorts, funded through LB21, have helped to foster expertise among recent graduates, while projects like Preserving Digital Objects With Restricted Resources (Digital POWRR) have focused on professional

**NDP Dollar Amounts by Focal Area
FY2015-FY2017**



**Expanding Digital Cultural Heritage Capacities
FY2015-FY2017 (\$18,469,815)**



Figures 4 and 5. The expanding digital cultural heritage capacities focal area from FY 2015 to FY2017, including grants awarded through the National Leadership Grants for Libraries Program and the Laura Bush 21st Century Librarian Program. Figure 4 shows the total funding for this focal area within the larger NDP portfolio. Figure 5 shows all grants in this focal area (n = 56) by funding category.

development for mid-career staff.

Digital cultural heritage work in libraries is also supported by a variety of local and national funding sources. Major funders in this area include the National Endowment for the Humanities, the National Historical Publications and Records Commission, the Alfred P. Sloan Foundation, and the Andrew W. Mellon Foundation.

Overview of Funded Projects

The first three years of NDP projects in the expanding digital cultural heritage capacities focal area include \$13,913,204 in NLG awards and \$4,556,611 in LB21 awards, for a total of \$18,469,815. This includes three sparks grants, eight planning grants, eleven national forum grants, twenty-five project grants and nine research grants.

Project Themes

Within the NDP portfolio of digital cultural heritage grants, several well-established themes have become apparent. Since the NDP was first articulated, grantees have leveraged funding to develop, expand, and increase adoption of shared digital collections infrastructures, create new models for hands-on professional training, and conduct research and development to support computational uses of collections. These thematic areas have each received substantial local and national investment, from IMLS and other sources. Viewed together, the following themes demonstrate a field wide interest in continuing collaborative work to build capacity for a range of institutions managing digital collections.

Building Shared Digital Collections Infrastructures

Increasing the capacity of smaller institutions is a key goal of NDP funding, and shared tools and services are central to achieving this goal. In the digital cultural heritage portfolio, this often means supporting national digital collections aggregators and other systems for collections access and preservation. By exploring hub-and-spoke and shared governance models, several major grant-funded projects have worked to build systems that can increase access to digital collections at a wide range of institutions. Through the tools and services they developed, each of these large projects have benefited institutions and communities well beyond the primary grantee.

- *Avalon Media System: Integrating audiovisual collections with research, digital preservation, and a sustainable developer community* ([LG-70-17-0042-17](#)), Northwestern University, \$967,088

- *Fostering a New National Library Network through a Community-Based, Connected Repository System* ([LG-70-15-0006-15](#)), Digital Public Library of America, \$1,999,897
- *Mukurto Hubs and Spokes: A Sustainable National Platform for Community Digital Archiving* ([LG-70-16-0054-16](#)), Washington State University, \$641,832

Developing Hands-on Training for Digital Collections Stewardship

The professional expertise required to manage digital collections is continually evolving as technology becomes more complex and embedded in the everyday work of librarians and archivists. With support from the LB21 program, several continuing education projects aim to increase workforce capacities by providing hands-on instruction. These experiences, like the NDSR cohorts mentioned earlier, allow participants to tackle real-world problems and apply newly learned skills to the challenges faced by their home institutions.

- *Community Webs: Empowering Public Librarians to Create Community History Web Archives* ([RE-85-17-0060-17](#)), Internet Archive, \$338,940
- *Curating Community Digital Collections* ([RE-85-17-0127-17](#)), Wisconsin Library Services, \$227,077
- *Professional Development Institutes for Digital Preservation* ([RE-85-17-0012-17](#)), Northern Illinois University, \$240,423

Enabling Computational Processing and Description

IMLS funding has supported several efforts to investigate how computational analysis of collections can support traditional archival processing activities. These projects apply approaches such as sentiment analysis, entity extraction, or computer vision to a diverse range of content types. Through applied research and development, these projects show great promise in increasing the scale by which archivists can describe, process, and enable access to their collections. Such advances allow institutions to make better sense of large-scale digital assemblages.

- *Email: Process, Appraise, Discover, Deliver - ePADD: Phase 2* ([LG-70-15-0242-15](#)), Stanford University, \$685,129
- *Extending Intelligent Computational Image Analysis for Archival Discovery* ([LG-71-16-0152-16](#)), University of Nebraska, \$462,317
- *Improving Access to Time-Based Media through Crowdsourcing and Machine Learning* ([LG-71-15-0208-15](#)), WGBH Educational Foundation, \$898,474

Emerging Areas

Although digital cultural heritage work has long been supported through IMLS funding, this area of practice continues to evolve as collections and systems become more complex and as technology enables new areas of work. As a result, IMLS has supported several emerging areas of work through NDP funding. NLG and LB21 grantees have leveraged planning grants and national forum grants to explore new content areas, develop and sustain communities of practice, and otherwise prepare the profession to ensure long-term access to digital collections.

Supporting Community-Based Digital Collections

Several funded projects seek to continue ongoing conversations ensuring that national digital collections are inclusive and representative of the many communities that libraries serve. A key component of this work is ensuring that collecting practices and metadata are sensitive to the cultural norms of the communities represented. Several recent grantees are convening stakeholders to examine and build community consensus around these complex issues of cultural representation.

- *Digital Memory in Rural Tribal Libraries: A Program for Technology Training & Memory Gathering* ([LG-72-16-0113-16](#)), Shift Design, Inc., \$48,743
- *Diversifying the Digital Historical Record: Integrating Community Archives in National Strategies for Access to Cultural Heritage* ([LG-73-16-0003-16](#)), Amistad Research Center, \$100,000
- *National Forum on Culturally Sensitive Practices and Data Curation* ([LG-73-16-0126-16](#)), Northeastern University, \$98,822

Collaborating to Address Complex Content Types

With the rapid pace of technological change, the size and complexity of digital library collections continues to increase. As they emerge, communities of practice develop around these new formats. Several national forum grants have supported work to develop best practices, launch partnerships, and build community expertise related to specific emerging content types. In many cases, these projects may be starting points for larger future collaborations.

- *Building for Tomorrow: Collaborative Development of Sustainable Infrastructure for Architectural and Design Documentation* ([LG-73-17-0004-17](#)), Harvard University, \$89,728
- *Dodging the Memory Hole 2016: Saving Online News National Forum* ([RE-33-16-0107-16](#)), University of Missouri, \$86,716

- *The Software Preservation Network* ([LG-73-15-0133-15](#)), California Polytechnic State University, \$99,131

Syncing National Systems with Local Practices

While national collections aggregators bring new opportunities for making use of collections from across many institutions, the networked digital library environment also brings to light the range of metadata standards and preservation practices employed by participating institutions. Several planning and national forum grants have supported work to ensure local practices, standards, and systems are interoperable with national ones.

- *Beyond the Repository: Integrating Local Preservation Systems with National Distribution Services* ([LG-72-16-0135-16](#)), Northwestern University, \$49,114
- *Linking People: Developing Collaborative Regional Vocabularies* ([LG-72-16-0002-16](#)), University of Utah, \$50,000
- *National Strategy for Shareable Local Authorities* ([LG-73-16-0040-16](#)), Cornell University, \$98,484

Scholarly communications is a rapidly expanding component of academic library services as libraries play increasingly critical and central roles in the production and dissemination of new knowledge. Libraries are building, revamping, and expanding services, as well as training users to support new forms of research and communication. In this context, scholarly communications includes all data and other products developed at any point during the research life cycle. This focal area often includes work supporting open source software, open science, open scholarship, and open data.

Libraries have long served critical roles in the production and dissemination of new knowledge. Essential information management includes cataloging, storing, and providing reference for journals, books, and other content formats. The scholarly record now expands far beyond journals and books to include many deliverables, including research data, software, white papers, grey literature, presentations, hypothesis registrations, pre-prints, and full digital system environments. New tools and services are crucial to managing these scholarly forms, which are themselves necessary for research reproducibility. As the types and scale of scholarly deliverables increase, libraries must explore how to provide access to, and preservation of, these research deliverables.

As research deliverables also become increasingly digital, the possibilities and expectations for wide accessibility of these scientific outputs continues to grow. Researchers, funders, government agencies, and United States taxpayers all have increasing expectations for access to the results of funded research. These growing expectations include mandates as well as changing social norms in research. Librarians have long been trusted as stewards of scholarly products, and recently their roles have been expanding to other scholarly deliverables like research data. However, these roles have largely existed at the end of the research life cycle. For example, scholars may deposit their data with the library once a research project is complete. Librarians also possess the expertise and capacity to be a source of scholarly research assistance throughout the entire research life cycle, through tools and services including research data management by establishing new kinds of publishing models and by providing data science services.

This section identifies emerging themes and areas that have arisen from IMLS awards related to opening scholarly communications, within the framework of

the NDP. Strong themes include building interoperable tools and services for use throughout the country, establishing research data management services in libraries, and expanding the role of library staff throughout the research life cycle. Emerging areas include transforming academic publishing and including data science training as a component of library science.

A handful of other funders also provide significant contributions to opening scholarly communications, including the Alfred P. Sloan Foundation, the Gordon and Betty Moore Foundation, the Laura and John Arnold Foundation, and the Andrew W. Mellon Foundation.

Overview of Funded Projects

The first three years of NDP projects in the opening scholarly communications focal area include \$3,802,178 in NLG awards and \$1,883,474 in LB21 awards, for a total of \$5,685,652. This includes one sparks grant, eight planning grants, four national forum grants, nine project grants, and four research grants.

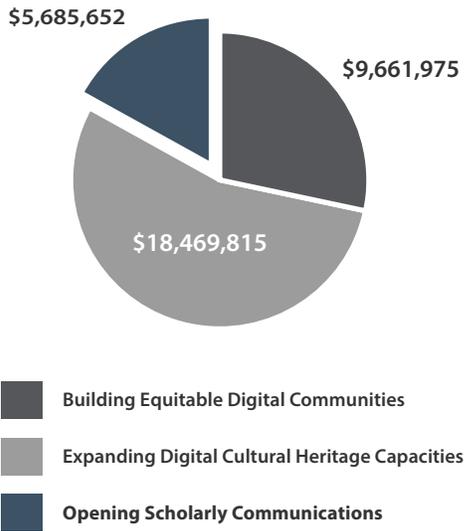
Project Themes

The essential roles of libraries and librarians in research are expanding in every direction. The scholarly record is growing to include a wealth of new forms of digital content including research data, software, presentations, pre-prints, websites, and full digital system environments. Libraries are embedding their services more directly into various stages of research and scholarly processes. Research data have become scholarly deliverables in their own right, and data management services are becoming increasingly common in libraries across the country. These efforts are making librarians more visible and directly integrated into the production of new knowledge, while also opening access to research and scholarly deliverables. This work makes the outputs and results of scholarship more openly accessible, usable, and reusable at every stage in the research process. Through these projects, academic libraries are expanding practices, tools, and methods for working with increasingly diverse types of content in new and more open ways and across the full research life cycle.

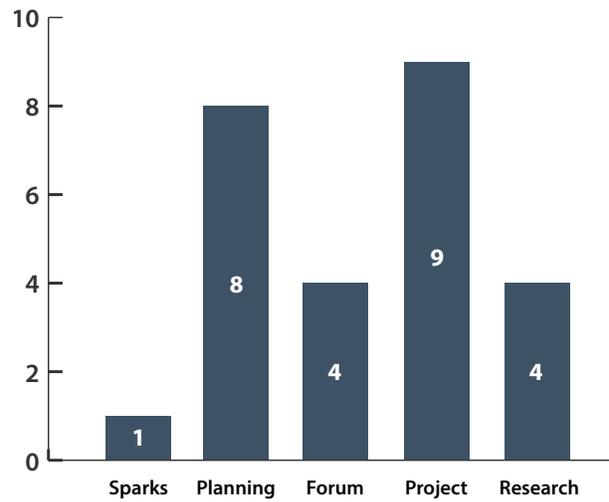
Interoperable Tools and Services to Support Researchers

Scholarly communications is related to the library role as caretaker of new knowledge. The breadth of materials necessary to analyze and reproduce research has expanded the kinds of information belonging in

**NDP Dollar Amounts by Focal Area
FY2015-FY2017**



**Opening Scholarly Communications
FY2015-FY2017 (\$5,685,652)**



Figures 6 and 7. The opening scholarly communications focal area from FY 2015 to FY2017, including grants awarded through the National Leadership Grants for Libraries Program and the Laura Bush 21st Century Librarian Program. Figure 6 shows the total funding for this focal area within the larger NDP portfolio. Figure 7 shows all grants in this focal area (n = 26) by funding category.

the scholarly record. This also expands the roles of library staff who provide access to and preserve these new kinds of research deliverables. These essential roles include developing tools and services related to scholarly outputs.

- *Fedora 4 API Extension (API-X) Architecture* (LG-70-16-0076-16), Johns Hopkins University, \$120,500
- *SHared Access Research Ecosystem (SHARE) Notification System* (*LG-00-14-0037-14), Association of Research Libraries, \$1,108,050
- *Towards engaging researchers in research identity data curation* (LG-73-16-0006-16), Florida State University, \$49,950

Establishing Data Services to Support Reproducible Research

As research data have become scholarly outputs in their own right, libraries have responded by developing research data management services. Responding to calls from funding agencies and researchers alike, these departments serve to ensure funder and regulatory compliance while also expanding the availability of research data for future reuse. This research data management work enables new forms of scholarship and ensures the quality and reproducibility of research.

- *Data Capsule Appliance For Research Analysis Of Restricted And Sensitive Data In Academic Libraries* (LG-71-17-0094-17), Indiana University, \$320,546
- *Developing Library Cyberinfrastructure Strategy for Big Data Sharing and Reuse* (LG-71-16-0037-16), Virginia Polytechnic Institute and State University, \$308,175
- *Digging Deeper, Reaching Further: Libraries Empowering Users to Mine the HathiTrust Digital Library Resources* (RE-00-15-0112-15), University of Illinois, \$398,844

Librarians Engaging in the Full Research Life Cycle

While library services often focus on managing research results after projects have already concluded, there exists capacity for library staff to serve in research roles throughout the research life cycle. The opening scholarly communications portfolio is intended to support and enhance library services at every point in the research life cycle, which benefits researchers while also developing a community of practice among library staff in support of these new roles.

- *Curating for Reproducibility (CURE) Consortium* (RE-87-17-0074-17), University of North Carolina At Chapel Hill, \$49,820

- *Research Data & Software Preservation Quality Tool* ([LG-72-16-0122-16](#)), University of Notre Dame, \$45,590
- *Scaling Up Perma.cc: Ensuring the Integrity of the Digital Scholarly Record Project Scaling* ([LG-70-16-0023-16](#)), Harvard University, \$782,649

- *Developing A Curriculum to Advance Library-Based Publishing* ([RE-40-16-0150-16](#)), Educopia Institute, \$205,726
- *Open Textbook Toolkit* ([LG-72-17-0051-17](#)), North Carolina State University, \$49,958

Emerging Areas

The preceding themes demonstrate ways academic librarians are expanding tools and services to serve their communities. Further potential exists to expand library services in a number of other ways. For example, as types of research deliverables expand, what it means to publish these records is also under review. The affordances of digital technologies are enabling libraries to increasingly serve as publishers. At the same time, academic libraries are spending more and more of their collections budgets for temporary access to publications, compelling librarians and researchers alike to identify new publishing business models. Academics are addressing this “serials crisis” in a number of ways, including efforts to support open access journals, library presses, intentional licensing, open educational resources, and pre-print archives.

Additionally, librarians are becoming embedded throughout the research life cycle as a result of their expertise in data science. Data science often refers to the capacity to use data, at any scale, to address questions of importance. Data scientists can be experts in data collection, management, analysis, visualization, or preservation— that is, data scientists can be experts in the management and use of data across the full research life cycle. The role of libraries as the facilitators of new knowledge is expanding to include new modes of publishing as well as data science expertise. IMLS grant applicants are keen to hold on to these broader roles for librarians.

Expanding Library Publishing Partnerships

As the types of artifacts included in the scholarly record evolves, librarians and researchers alike are examining new workflow models to manage, preserve, and provide access to these intellectual products. As library publishing adapts to the increasing variety of intermediate and final outputs of scholarly work, the models by which libraries collect and provide access to these information resources also increases. A number of recent IMLS awards reflect how library staff are coming to better understand, develop infrastructures for, and advance knowledge services to researchers based on how the scholarly record is changing.

Data Science in Library Science

As more librarians become skilled in components of data science, the broader the range of roles librarians can and will play in the research enterprise. Library services can include scholarly communication efforts throughout the life cycle, including calibrating, collecting, locating, cleaning, analyzing, and visualizing data. These efforts are natural enhancements to established library roles in the stewardship of scholarly deliverables.

- *Always Already Computational: Library Collections as Data* ([LG-73-16-0096-16](#)), University of California, Santa Barbara, \$100,000
- *LIS Education and Data Science for the National Digital Platform (LEADS-4-NDP)* ([RE-70-17-0094-17](#)), Drexel University, \$313,269
- *The Data Scientist as the 21st Century Librarian?* ([RE-43-16-0149-16](#)), University of Pittsburgh, \$97,911

The national digital platform (NDP) is a dynamic and evolving framework for systematically improving the ability of libraries and archives to provide digital content and services to users across the country. The work described in each of the areas of this report illustrates the extent to which cultural heritage institutions are responding to the challenge to develop a more integrated, equitable, and dynamic set of interconnected infrastructures for digital library services. This work will continue to develop and be defined in dialogue with librarians and archivists across the country through the competitive process of grant-making in the NLG and LB21 grant programs.

IMLS-funded NDP NLG and LB21 projects represent only part of the related conversations and collaborations throughout the national library and archives communities. Over the past two decades, IMLS has cumulatively invested more than one billion dollars in developing and improving digital library tools, services, and infrastructures. The foundation of IMLS support for digital infrastructures comes through the Grants to States component of the Library Services Technology Act (LSTA), which annually provides population-based formula grants to each state library administrative agency. From 2002 to 2011, the Grants to States program supplied \$980 million in support of information infrastructure projects, including \$67 million toward digitization efforts. Over the years, several other public and private funders— notably, the National Endowment for the Humanities, the Andrew W. Mellon Foundation, the Alfred P. Sloan Foundation, the Bill & Melinda Gates Foundation, and the John S. and James L. Knight Foundation— have and continue to make significant contributions to library and archives digital services and infrastructures.

Collectively, these efforts are helping libraries envision, refine, and implement digital infrastructures. As libraries collaborate in the development of shared tools and services, IMLS competitive grant programs will continue to promote best practices to support success in the field. The projects discussed throughout this report illustrate concrete examples of how library and archives communities are responding to the call to action that the NDP funding opportunities in NLG and LB21 present.

The themes that emerged in this work illustrate potential trajectories for further IMLS funding to advance and improve our shared national digital platform. Many of these ongoing projects present direct opportunities for

individuals to join in and advance this work. IMLS is excited to see how librarians and archivists across the nation respond to the synthesis of this work to date and continue to build on it in future grant cycles.

This appendix includes abstracts for all funded projects in the “Building Equitable Digital Communities” focal area, including those that were highlighted above.

Laura Bush 21st Century Librarian Program

Planning Grants

RE:Search Unpacking the Algorithms that Shape Our UX ([RE-72-17-0103-17](#)), Montana State University, Inc, \$50,000

The Montana State University Library will conduct an environmental scan of the field’s knowledge of algorithms, develop a proof of concept search application employing common algorithms, and create an Open Educational Resource (OER) curriculum and pilot class that will be taught to librarians to improve digital literacy based on the algorithms that define online experiences and shape technology. The planning grant will primarily support releasing a curriculum for teaching about algorithmic awareness; teaching a pilot course on algorithmic awareness for librarians; developing a working proof of concept application showing algorithms in practice; convening of an advisory council to shape the curriculum via online sessions and an in-person meeting; and testing and evaluating librarian and library patron’s awareness of algorithms and their role in our online experiences.

National Forum Grants

On the Record, All the Time: Setting an Agenda for Audiovisual Evidence Management ([RE-43-16-0053-16](#)), University of California, Los Angeles, \$99,970

The UCLA Department of Information Studies received a National Forum grant to bring together stakeholders responsible for the management of new forms of digital audiovisual evidence used by law enforcement. The project will help set specific priorities for the management and preservation of evidence generated by the widespread use of surveillance cameras, smartphones, and bodycams. The goals of the project are to identify areas of skill development for information professionals in law enforcement agencies, libraries, and archives, and to build institutional capacity for education that addresses information professionals’ management of digital information and open data. By holding a three-day workshop with participants from a range of fields, the project will facilitate information exchange and collaboration between law enforcement, and LIS professionals.

Project Grants

Creating Local Linkages: Training Public Librarians to

Facilitate Doing Digital Local History ([RE-85-17-0029-17](#)), George Mason University, \$332,111

The Roy Rosenzweig Center for History and New Media (RRCHNM) at George Mason University will develop and run a program to train at least 300 public librarians to facilitate local digital history programs across the country. The project will introduce public librarians to a range of historical research methods and digital history skills. It will also support librarians in developing public programming to engage in digital local and community history. The project will result in two related deliverables. First, through facilitation of four online courses and four in-person workshops, the project will train at least 300 librarians on practices and techniques of local digital and community history. Second, in support of those training opportunities, the project will develop and launch a curricula of open educational resources (OERs) which can be used, reused, and remixed by any other organization or program.

Creative Commons Certificate for Librarians ([RE-00-15-0116-15](#)), Creative Commons Corporation, \$300,858

Creative Commons in collaboration with partners the American Library Association, the California State University System and the Digital Public Library of America, will design, develop, and deliver a professional development and continuing education certification program for librarians. The certificate will help librarians acquire Creative Commons knowledge and skills leading to increased capacity, services, and support for a wide range of 21st century library functions associated with Open Access (OA), open data, Open Educational Resources (OER), and public domain materials. The Creative Commons certificate for librarians will include both a modular set of learning materials that can be used independently for informal learning, and a formal, structured, and facilitated certificate the can be taken for official certification.

Developing Open Education Leaders for 21st Century Libraries ([RE-70-17-0073-17](#)), Regents of the University of Minnesota, \$247,912

The Regents of the University of Minnesota will create the Open Educational Resources (OER) Librarian Bootcamp, a professional development program to prepare librarians who are, or are interested in becoming, stewards and advocates for open educational resources. Through the Bootcamp, 30 librarians will develop comprehensive knowledge in open education and open education programming. The integrated

components of the OER Librarian Bootcamp program will include: pre-workshop online content, mentor-led cohorts, an immersive four-day in-person workshop, and post-workshop program development and assessment. The pre-workshop component includes online training developed as part of a previously funded IMLS project, the Creative Commons' Librarian Certificate program.

Digital Skills for Digital Librarians ([RE-00-15-0105-15](#)), Mozilla Foundation, \$808,601

The Mozilla Foundation, in collaboration with The Technology and Social Change Group (TASCHA) at the University of Washington Information School, will refine and launch an open source curriculum, training, tools, and credentials for a library audience to learn web literacy skills and develop digital competencies. The project intends to empower library staff to provide patrons with opportunities to develop the digital skills they need for better success in such areas as education, workforce development, and civic engagement. The project will first identify core digital literacy badges for library professionals that include technical and 21st century skills aligned with Mozilla's Web Literacy Map. The team will pilot the resources in five public library systems representing geographic, demographic, and experiential diversity. Emphasis will be placed on underserved communities, and populations will be selected for testing. In addition, one school of library information studies will also be selected to test curriculum, training, and credentials.

Experience Assessment: Building User Experience and Assessment Capabilities in Libraries and Information Centers ([RE-20-16-0036-16](#)), University of Tennessee, \$811,501

Information professionals are expected to test users' experience (UX) online to create user-friendly environments for a diverse range of users, but few LIS programs prepare their graduate students for this work. Experience Assessment: Building User Experience and Assessment Capabilities in Libraries and Information Centers is a two-year master's level degree project that will bring together an interdisciplinary team and robust facilities at the University of Tennessee (UT) to create 12 leaders in user experience and assessment and develop an open access curriculum to continue creating these professionals. Students will complete hands-on, mentored research experiences at UT UX laboratories, UT Libraries, Oak Ridge National Laboratory, U.S. Geological Survey, Information International Associates, and the Tombras Group.

Open Data for Public Good: Data Literacy Education for

Public Information Professionals ([RE-40-16-0015-16](#)), University of Washington, \$690,858

The University of Washington will develop an educational program to prepare both new students and practicing professionals to: curate collections of open data of value to local communities, build infrastructure and preservation environments needed to sustain open data collections, and collaborate with open data providers on advocacy and outreach activities. Project collaborators include the Seattle Public Library, Washington State Historical Society, Washington State Department of Transportation, and the Washington State Office of Technology. The project will benefit over 100 LIS students, through new course creation and practical field experience, and approximately 60 professionals, through webinars and open educational resources. The summative evaluation of the project will also include a study of broader workforce needs for public open data expertise.

Privacy in Libraries ([RE-95-17-0076-17](#)), New York University, \$249,504

New York University, in partnership with the Library Freedom Project, will facilitate the use of practical privacy tools in libraries and their communities through the development of a privacy-focused train-the-trainer program for librarians, known as the Library Freedom Institute (LFI). The project team will construct an extensive curriculum and use it to train 40 geographically dispersed Privacy Advocates, who can then serve as nodes of expertise in their regions by conducting training workshops for community members and helping their own libraries become more privacy conscious. Over a six-month course, project staff and guest trainers will teach the Privacy Advocates how to lead privacy-focused computer classes. During a two-year project timeline, the project will plan and run a pilot iteration of the LFI, analyze it, make revisions to the curriculum, offer a full-scale LFI to a larger cohort of librarians, and evaluate the full program.

Redesigning State-Level E-Rate Support ([RE-00-15-0111-15](#)), COSLA, Inc. Chief Officers of State Library Agencies, \$95,200

The Chief Officers of State Library Agencies (COSLA) will enable libraries to take full advantage of the opportunities for transformation provided by the FCC's E-rate Modernization Orders. COSLA will evaluate possible support program changes, such as consultation service and training needs of new State Library Administrative Agencies staff, based on a cross-state review of needs. The Georgia Public Library Service, acting in conjunction with the

American Library Association's E-Rate Task Force, will implement a clearinghouse for best-of-breed information, documentation, and best practices to serve as an information resource and to stimulate a national community of practice around libraries and E-rate.

Scaling Digital Privacy & Data Literacy in Libraries (RE-06-15-0050-15), Brooklyn Public Library, \$240,729

Brooklyn Public Library, in partnership with the Metropolitan New York Library Council, New America Foundation's Open Technology Institute, and the Data & Society Research Institute, will promote digital privacy and data literacy among library professionals. This collaboration will bring together librarians, policy advocates, technologists, and the communities they all serve to further advance libraries and librarians as leaders in bridging not just the digital divide but also the privacy digital divide. Individuals with the greatest digital literacy needs are also the most vulnerable to abuses of personal data. Libraries and librarians are uniquely positioned to prepare all patrons for the privacy challenges brought about by the pervasiveness of data sharing, profiling, collection, and surveillance technologies.

StoryCorps - Digital Storytelling and Collection Resources (RE-40-16-0094-16), StoryCorps, Inc., \$249,999

StoryCorps will develop a set of web-based interactive tools and an app to help librarians use digital technology to engage with diverse constituents and develop unique and wide-ranging community documentation projects. The project will expand on StoryCorps' existing resources and make them more readily accessible to more libraries as interested libraries can use the web-based resources to receive training in StoryCorps' methods. In addition, the new app will provide libraries with a low-cost method for people to record, preserve, and share interviews as libraries will no longer have to buy their own recording equipment or borrow equipment from StoryCorps to record stories. Particular emphasis will be placed on creating customized tools for small, rural, and tribal libraries to support outreach and interview collection in the communities served by these institutions. The project will offer interactive workshops about the tools at the annual Association of Tribal Archives, Libraries and Museums conference and the annual Association of Rural and Small Libraries conference.

Toward Gigabit Libraries (RE-00-15-0110-15), University Corporation for Advanced Internet Development (Internet2), \$248,725

University Corporation for Advanced Internet

Development, commonly called "Internet2," and its member Research & Education networks, in partnership with the Association of Tribal Archives, Libraries, and Museums; the American Library Association; the Association of Rural and Small Libraries; and the Chief Officers of State Library Agencies, will run a pilot project to develop a library broadband network assessment toolkit and training program for rural and tribal libraries. Over the course of this 24-month project, Internet2 will pilot the use of the toolkit with at least 30-50 library practitioners in at least 30 rural public and tribal libraries across five states.

Research Grants

At the Edges of the National Digital Platform: Rural Library Hotspot Lending Programs (RE-31-16-0014-16), University of Texas At Austin, \$496,586

Investigators at the University of Texas at Austin, in partnership with researchers at the University of Oklahoma and Oklahoma State University, will use their research grant to examine how rural libraries address the challenges of Internet connectivity with hotspot lending programs. The project will gather qualitative and quantitative data from 24 rural libraries with hotspot lending program experience, focusing on the librarians involved with the program, the users of the program, local community stakeholders, and non-users. Research outcomes will address the role of rural libraries in local information ecosystems, the impact of hotspot lending programs on users' quality of life and digital literacy, community outcomes of these programs, and practical requirements for offering hotspot lending programs. Deliverables for the project include a guidelines document on program implementation, a short report on rural Internet connectivity and libraries, and a final research report.

National Leadership Grants for Libraries

Planning Grants

BKLYN Link (LG-72-16-0130-16), Brooklyn Public Library, \$50,000

Through this planning project, Brooklyn Public Library (BPL) will pilot BKLYN Link, a community-driven mesh network providing free broadband access and a technology-based fellowship program for young adults ages 18-24. A mesh network is a wireless network that uses radio nodes and laptops, cell phones, and other wireless devices to provide reliable access to the Internet. BPL will conduct community asset mapping in three low-income Brooklyn neighborhoods to identify which community is best positioned to host a mesh network; plan the technical structure of a mesh network and develop user policies and procedures; design a technology-based youth fellowship program that would

teach young adults to install and maintain the mesh network; pilot a five-month abbreviated version of the fellowship; and develop a “playbook” of strategies and tools for deepening community engagement and launching a mesh network.

Design and Evaluation of a “Digital Transparency Platform” for Advancing Legislative and Regulatory Transparency (LG-72-17-0078-17), University of Georgia Research Foundation, Inc., \$49,839

The University of Georgia Alexander Campbell King Law Library, in partnership with the UGA Terry College of Business Department of Management Information Systems (MIS) and Georgia School of Law, will plan and prototype an open-source open government digital transparency platform. This platform will provide data access and visualization of the U.S. legislative process. For this prototype phase, the project will focus on the passage of the Jumpstart Our Business Startups Act of 2012 (JOBS Act). This interactive, informative tool will aid citizens in becoming more engaged, allowing them to form their opinions in a quick, fact-based, and safe online environment. By combining text analysis, network analysis, and visualization the project will provide insights into how libraries can take on new roles supporting access to government and legislative information and data.

Repository Services for Accessible Course Content (LG-72-15-0009-15), Trustees of Tufts College, Inc., \$49,870

This planning project, led by Tufts University, will bring together experts from disability services with librarians, IT professionals, advocates, and legal counsel to develop work plans for shared infrastructure, within which universities can support their students with disabilities. Disability accommodations frequently include altering course content to make it accessible. Repository services are needed to enable schools to deposit their own accessible digital files, use files from other institutions, and reduce the number of searches required for content discovery. Using focus groups, working groups, a stakeholder colloquy, and an advisory board for guidance, the project will result in a white paper summarizing findings, a work plan for creating repository services and a paper to submit for publication. The intention is to create specifications and a business model that will complement existing platforms and services.

National Forum Grants

A National Forum on Principles of Accessibility and Inclusion for the Design of Library Systems (LG-73-17-0162-17), Massachusetts Institute of Technology, \$92,170

The Massachusetts Institute of Technology will convene

a workshop to identify gaps, opportunities, and best practices for designing library information systems that can incorporate local knowledge, accommodate different modes of learning and cognition, and foster diverse approaches to organizing information. The goal of the project is to consider how best to provide services that are accessible to communities with a range of abilities and viewpoints. It will address concerns that algorithms, interfaces, and ontologies embedded in current library systems incorporate substantial biases. The primary output of the project will be a white paper summarizing the significance and areas of need for diversity and inclusion; identifying high-impact design principles that are accepted and emerging in the broader community; characterizing approaches and methods for applying these principles to library information systems; and identifying potential next steps for software developers that develop these systems and for library institutions that adopt and deploy them.

Investigation of Possible Uses of Blockchain Technology by Libraries-Information Centers to Support City-Community Goals (LG-98-17-0209-17), San Jose State University Research Foundation, \$100,000

The San Jose State University School of Information iSchool will investigate ways that blockchain technology can be used by libraries to partner with other organizations and to support city or community goals. Blockchain technology is a shared digital/electronic ledger featuring a constantly updated list of transactions. It is supported by a peer-to-peer network that may be either public or private. This technology has the potential to help libraries develop a distributed metadata system; facilitate better digital rights management; and create a protocol for supporting community based collections. The proposed National Forum would bring together 20-30 technical experts in libraries, blockchain technology, and urban planning to discuss ways that blockchain technology can advance library services to support city or community goals. The resulting commentary from a project blog, national forum, and conference and the survey data will be evaluated and included in the project’s final report, which will be available online. The recommendations will serve as a guide for both large and small, urban and rural libraries to implement blockchain technology or consider other directions.

Library Values & Privacy in our National Digital Strategies: Field guides, Convenings, and Conversations (LG-73-17-0062-17), University of Wisconsin System, \$90,150

The University of Wisconsin-Milwaukee Center for Information Policy Research in partnership with Data &

Society, and the American Library Association's Office of Intellectual Freedom will host a national forum exploring what the library value of privacy means in the digital world. The forum will bring together library practitioners and administrators, along with technology, policy, and privacy experts, to establish a national roadmap for a digital privacy strategy for libraries. Along with the roadmap, the project will produce a series of field guides for librarians that clearly lay out important privacy and security issues. Field guides will include topics such as: privacy by design, internal library information systems, third-party library software systems, cloud-based library systems, public internet and wifi services, licensing of digital content, data security, government information requests, and social media strategies.

Preservation of Electronic Government Information National Forums (LG-88-17-0129-17), University of North Texas, \$87,000

The University of North Texas, in collaboration with the University of North Carolina at Greensboro, the University of California at Santa Barbara, the University of Missouri, the University of Pennsylvania, Stanford University, Yale University, the Center for Research Libraries (CRL), the Educopia Institute, and the Scholarly Publishing and Academic Resources Coalition (SPARC) will hold national forums in 2018 to address national concerns regarding the preservation of electronic government information (PEGI) by cultural memory organizations for long term access by citizens of the United States. By convening a series of expert groups and key stakeholders the project will identify and surface a broadly shared national consensus and agenda on specific future steps needed to preserve and provide long term access to electronic government information in the United States.

Project Grants

Creating Digital Library (DL) Design Guidelines on Accessibility, Usability and Utility for Blind and Visually Impaired (BVI) Users (LG-70-16-0038-16), University of Wisconsin System, \$495,600

The University of Wisconsin and partners will collaborate to develop digital library design guidelines on accessibility, usability, and utility for blind and visually impaired (BVI) users. The project is motivated by the belief that approximately 20.6 million Americans with significant vision loss cannot use digital libraries effectively due to their sight-centered design. Accessibility guidelines exist but fail to address help-seeking situations of blind and visually impaired (BVI) users in their interactions with digital libraries. Consequently, digital library providers are unable to

reach the BVI community, and comply effectively with the Americans with Disabilities Act (ADA). This project generate three products: 1) digital library design guidelines, organized by types of help-seeking situations associated with accessibility, usability, and utility; 2) a report on the current status of how digital libraries satisfy BVI users' help needs; and 3) a methodology that can be applied to other underserved user groups to develop similar guidelines.

Developing Public and Academic Libraries as Key Participants in Civic Open Data Ecosystems (LG-70-17-0146-17), University of Pittsburgh, \$224,761

The University Library System at the University of Pittsburgh, in partnership with the Carnegie Library of Pittsburgh, the Western Pennsylvania Regional Data Center, and the Urban Institute, which supports and coordinates the National Neighborhood Indicators Partnership, will develop the capacity of public and academic libraries to serve as key partners in local open civic data ecosystems. The project's primary output will be a guide and toolkit to help public and academic libraries: identify local needs and contexts around open civic data; consider roles, opportunities, practices, and governance in the civic data ecosystem; anticipate and address common challenges; measure local civic open data health and capacity; and learn from examples of successful civic data partnerships.

Libraries Leading in Digital Inclusion and Disaster Response via TV WhiteSpace Wireless Connections (LG-70-16-0114-16), San Jose State University Research Foundation, \$249,998

This project will help libraries explore dramatically expanding internet access in their communities by using TVWhiteSpace (TVWS), a new low-cost wireless technology. This project will be led by San Jose State University's School of Information. Key collaborators, including the Gigabit Libraries Network, the School, Health, & Libraries Broadband Coalition, the National Digital Inclusion Alliance, and the Information Technology Disaster Resource Center, will explore dramatically expanding digital access/inclusion and modes to provide connectivity as part of disaster preparedness.

Library E-Content Access Project (LEAP) (LG-00-15-0263-15), New York Public Library, \$1,372,154

The New York Public Library (NYPL), in close collaboration with the Digital Public Library of America (DPLA), and 19 partner libraries and library consortia from across the country will expand and provide outreach for the Library Simplified open source eBook platform. Through this work, the partners aim to

unify and improve the eBook borrowing and reading experience for library users across the country. The project directly supports technology development and implementation of the Open eBooks initiative, an effort to make eBooks available to children and youth from low-income families. The project also supports a broader strategy to enhance open source software tools for public library systems across the country to provide access to eBooks.

SimplyE for Consortia: Three Clicks for All Your Ebooks ([LG-70-16-0010-16](#)), Regents of the University of Minnesota, \$695,000

Minitex, in partnership with the Massachusetts Library System (MLS) and Reaching Across Illinois Library System (RAILS), will enhance SimplyE, an open source e-reader designed specifically to streamline and improve the e-book circulation process for library patrons. SimplyE, which is currently designed to provide a seamless user experience for public library patrons, will be modified for academic, public, and school library users. SimplyE will become an even more effective element of the National Digital Platform by making the access and discoverability of e-books easier for all library users. The project partners will represent the needs of a broad range of library users, enabling the design and development of features that will allow for the participation of schools, research libraries, and consortia with shared e-book collections. In addition, this project will address the viability of expanding interlibrary loan (ILL) of e-books by exploring ILL policies and functionality for SimplyE.

The Memory Lab Network: National Distribution of the Public Library Memory Lab Model ([LG-95-17-0079-17](#)), District of Columbia, Government of, \$249,282

In partnership with the Public Library Association, DC Public Library (DCPL) will identify seven public libraries to receive training, mentoring, equipment and financial support to create programs for community members to digitize and preserve their personal and family collections. Modeled after DCPL's successful Memory Lab, the resulting personal archiving stations will allow libraries to foster deeper community engagement and expand staff and patron expertise in personal archiving. The cohort of participants will contribute to an emerging network of libraries with personal archiving programs, and the project will also result in documentation and training materials for implementation and use of similar stations in other libraries.

Research Grants

Exploring OER Curation and the Role of School Librarians ([LG-86-17-0035-17](#)), Institute for the Study of

Knowledge Management in Education, \$475,278

The Institute for the Study of Knowledge Management in Education (ISKME) in collaboration with Florida State University's School of Information will conduct research and develop a framework for K-12 school librarians as leaders in curating and promoting open educational resources (OERs) to enhance teaching and learning. Through in-depth case studies of school librarian leaders in OERs across a spectrum of school districts, the project will document OERs digital curation practices and workflows, identify how librarians can lead in all aspects of OERs use to align with school district goals and fulfill student needs, and create and disseminate practical recommendations for establishing the key roles school librarians can play in the adoption and implementation of open educational resource strategies. Project findings will be widely disseminated to the target audiences of school and district leaders, librarians, researchers, teachers, professional networks, and policymakers at the local, state, and federal levels to serve the diverse needs of communities across the nation.

Library Knowledge Extensions (KNEXT): Data Analytics to Support Innovation Communities ([LG-71-17-0124-17](#)), Kent State University, \$458,319

Kent State University's KNEXT project will bring advanced data analytics and business intelligence (DA&BI) services to public libraries in order to support small businesses, entrepreneurs, and community advocates. This project will further develop a coalition of academic, public libraries, small business development centers, small businesses, and community advocates by identifying sources of useful data (national, state, county); consolidating data in a repository for long-term access and delivery; and creating a platform and dashboard for libraries to provide DA&BI services to the community using machine learning, data mining, web mining, and text analytics.

This appendix includes abstracts for all funded projects in the “Expanding Digital Cultural Heritage Capacities” focal area, including those that were highlighted above.

Laura Bush 21st Century Librarian Program

Planning Grants

Common Mission, Common Ground: Digital Library Collections, Pedagogy, and Pathways at the HBCU Library Alliance/Liberal Arts Colleges Pre-Conference (RE-87-17-0079-17), Council on Library and Information Resources, \$49,950

The Digital Library Federation (DLF) will provide at least 21 travel fellowships for participants from historically black colleges and universities (HBCUs) to attend the DLF Forum conference, as well as a DLF Liberal Arts Colleges (LAC) preconference session intended to facilitate conversation between HBCUs and the DLF community. The fellowships will broaden the range of voices present at the preconference, which will focus on digital pedagogy and the curation of culturally sensitive digital collections. A final report will discuss the outcomes of the meeting and help set the direction for future partnerships between the DLF LAC community and the HBCU Library Alliance.

National Forum Grants

“Dodging the Memory Hole 2016: Saving Online News” National Forum (RE-33-16-0107-16), University of Missouri System, \$86,716

The University of Missouri Libraries in collaboration with the Donald W. Reynolds Journalism Institute, University of California Los Angeles Library, and the Educopia Institute, will host a national forum for 100 attendees from multiple sectors to advance knowledge and practice of preserving online born-digital news content. The forum will be the third in the Dodging the Memory Hole series and has the overarching goal of developing and implementing a national strategy for born-digital news preservation as traditional systems for collecting, preserving, and providing access are not adequate for preserving a vital and growing portion of our nation’s cultural record in the 21st century. In addition to the forum, the project includes the production and publication of an outline for a national agenda for preserving born-digital news online; identification of roles for stakeholders; facilitation of knowledge sharing; examination of technology platforms; preparation of students; and the identification of fundable projects that will advance online preservation practice.

The National Digital Stewardship Residency Symposium (RE-43-16-0067-16), New York Metropolitan Reference and Research Library Agency, \$100,000

The Metropolitan New York Library Council (METRO), in partnership with a coalition of National Digital Stewardship Residency (NDSR) organizers and stakeholders, will hold a symposium focused on evaluating and sharing the work performed over the first four years of NDSR programs. The meeting aims to: discuss and create standardized guidelines based on the NDSR evaluation being undertaken by the Council on Library and Information Resources; expand the geographic reach of NDSR; foster a digital preservation community of practice; and raise awareness of the NDSR program. The symposium will be free and open to the public, and grant funding will support attendance by representatives of organizations that serve under-resourced areas. Following the symposium, agreed-upon NDSR standards and guidelines will be compiled into a handbook to encourage the development of future digital stewardship residency programs.

Project Grants

American Archive of Public Broadcasting National Digital Stewardship Residency Project (RE-06-15-0039-15), WGBH Educational Foundation, \$450,126

WGBH, with the American Archive of Public Broadcasting (AAPB), a collaboration between the WGBH Education Foundation and the Library of Congress, will develop a National Digital Stewardship Residency (NDSR) project to train residents and develop curriculum for an increasingly critical area of digital preservation, the preservation of audiovisual materials. The AAPB NDSR project will place residents at diverse geographic public television and radio stations across the country and thus expand the locally based NDSR model to a national level. The project will also provide important information and lay the groundwork for a virtual national NDSR fellowship program.

Art Museum Libraries: A National Digital Stewardship Residency Program (RE-40-16-0105-16), Philadelphia Museum of Art, \$421,750

The Philadelphia Museum of Art will partner with the Art Libraries Society of North America (ARLIS/NA) to adapt the existing National Digital Stewardship Residency (NDSR) program to create a curriculum focused on art information management. The project will support eight residents over two years. Residents will complete projects at art and cultural heritage libraries across the

country, increasing the functionality and accessibility of their host institutions' digital content and services. Mid-career mentors at each institution will also have the opportunity to participate in training and professional development. Curricula developed for this program will also be distributed by ARLIS/NA, increasing the impact of the project for art librarians and archivists nationwide.

Community Webs: Empowering Public Librarians to Create Community History Web Archives (RE-85-17-0060-17), Internet Archive, \$338,940

The Internet Archive will train 15 public librarians on using web archives to capture historically valuable web materials documenting their local communities. Participating librarians will receive intensive training in a variety of web archiving topics through in-person and online trainings, professional support from experts on web archiving in public libraries, and cohort-based activities. Training materials will also be made freely available online for reuse by others. Participants' institutions will be provided with five-year subscriptions to the Internet Archive's Archive-It service, resulting in the long-term preservation of over 35 terabytes of web-published community history materials. This project will increase the capacity of public libraries nationwide to participate in web archiving and document their community history.

Curating Community Digital Collections (RE-85-17-0127-17), Wisconsin Library Services, \$227,077

Wisconsin Library Services, in partnership with the University of Wisconsin-Madison's School of Library and Information Studies and the University of Wisconsin-Milwaukee's School of Information Studies, will implement a program to provide library school students with practical experience in digital stewardship through summer fieldwork positions. By placing students in small and under-resourced memory institutions across Wisconsin, the project will also increase the capacity of small libraries and cultural heritage organizations to curate their digital collections. Over two years, 16 students and 10-16 host institutions will receive training and mentoring in digital stewardship and will work together to manage, preserve, and provide access to materials digitized from analog formats, as well as born-digital items.

Fostering a Community of Practice: Software Preservationists and Emulation Experts in Libraries and Archives (RE-95-17-0058-17), Cal Poly Corporation, \$249,686

Library staff from California Polytechnic State University and the University of Texas at Austin will

train a cohort of archivists, librarians, and curators to develop emulation and software preservation services in their cultural heritage organizations. Emulation is a digital technique that allows new computers to run legacy systems so older software appears the way it was originally designed. While a broad range of cultural heritage institutions need to access and preserve legacy software, most do not have the expertise or resources to do so. The project will build the skillsets of participating individuals through hands-on experiences, as well as develop a cohort for broad implementation of emulation and software preservation services across the cultural heritage community.

Library Education for the US-Affiliated Pacific: A Project to Strengthen the Digital Future of the Pacific (LEAP II) (RE-01-15-0087-15), University of North Texas, \$499,991

The University of North Texas, in partnership with the Brigham Young University-Hawaii, will support a three-year master's in library and information science degree program to continue to increase the number of degreed library professionals for the geographically dispersed US Affiliated Pacific Islands. The IMLS LEAP-II project will educate twelve more indigenous librarians and information stewards with skills in curation and preservation of digital projects and collections with an emphasis on digital content management. Students will receive tuition, travel support, a computer, and association dues and will complete enhanced enrichment activities including professional development programs, library and museum tours, individual mentors, and specialized workshops on advanced digital technologies and information literacy.

National Digital Stewardship Residencies (NDSR) Assessment (RE-00-15-0107-15), Council on Library and Information Resources, \$172,996

The Council on Library and Information Resources (CLIR) will conduct a formative assessment research project to capture and analyze the diversity of the National Digital Stewardship Residents experience across five related programs. By the summer of 2016, 40 graduates of library and information science master's programs will have completed IMLS National Digital Stewardship Residencies in select institutions across the U.S. The residents' experiences have varied widely according to the type and size of institution in which they are based, the collection formats with which they work, and the approach to education and training taken by the teams of professionals responsible for their cohorts. The research team will produce a final report making recommendations to inform funders, professional organizations, and future hosts of and applicants to programs developed from the NDSR model.

Planning BHL Version 2.0 ([RE-40-16-0082-16](#)), President and Fellows of Harvard College, \$370,756

The Biodiversity Heritage Library (BHL), led by the Ernst Mayr Library of the Museum of Comparative Zoology, Harvard University (MCZ), will host a National Digital Stewardship Residency (NDSR) cohort. The NDSR cohort will include five residents from across the country, all graduates of LIS or related master's programs, in a collaborative project to improve tools, curation, and content stewardship at BHL. Each host institution will provide mentorship to a resident for a specific project designed to improve the functionality of BHL and will identify how tools and processes may be transferred to or from other digital library and museum environments. Residents will be hosted at the following institutions: the Field Museum of Natural History and the Chicago Botanic Garden, Harvard University, Missouri Botanical Garden, Los Angeles County Museum of Natural History, and Smithsonian Libraries.

Professional Development Institutes for Digital Preservation ([RE-85-17-0012-17](#)), Northern Illinois University Inc., \$240,423

Building on the success of the Preserving Digital Objects With Restricted Resources (Digital POWRR) project, Northern Illinois University will hold five two-day institutes enabling librarians and archivists from small and mid-sized institutions to build skills for curating and preserving digital collections. A total of 150 individuals, each representing a different institution, will attend the workshops. Workshops will be offered free of charge, with financial assistance available to participants with need, and will incorporate hands-on training, case studies, and one-on-one consultation with experts. The project will result in cohorts of similar organizations engaged in digital curation and preservation, as well as facilitate connections between small institutions and local experts in these subjects.

Tribal Digital Stewardship Cohort Training: Cultural and Collaborative Curation Models and Methods ([RE-85-17-0115-17](#)), Washington State University, \$449,726

Washington State University (WSU) will extend the Tribal Digital Stewardship Cohort Training program, which supports the educational and curatorial needs of tribal archives, libraries, and museums, to include 24 participants from 12 tribes over two years. Participants will receive online and face-to-face trainings as well as mentorship. Emphasizing the collaborative curation method, this program expands the digital stewardship lifecycle curriculum created at WSU to include methods and tools to curate collections in partnership with non-native repositories through ethical frameworks

for sustained engagement. This model emphasizes long-term engagement, sharing digital content, and enriching metadata with tribal knowledge for broad accessibility. The project will include updates to the existing Tribal Digital Stewardship curriculum as well as the creation and dissemination of Open Educational Resources (OER) for all curricular modules.

Research Grants

Improving Access to Time-Based Media through Cataloging Tools ([RE-85-17-0092-17](#)), WGBH Educational Foundation, \$898,474

WGBH Educational Foundation (WGBH) will host a Public Broadcasting Preservation Fellowship for 10 students enrolled in library and information science (LIS) graduate programs to pursue digital preservation projects at public broadcasting organizations around the country, gaining hands-on experience in audiovisual preservation. WGBH will work with five partner universities: University of North Carolina at Chapel Hill, University of Missouri, University of Oklahoma, San Jose State University, and Clayton State University. Each university will be paired with a local public media station to serve as a fellowship host. Fellowship placements will address the need for digitization of at-risk public media materials and increase audiovisual preservation education capacity in LIS graduate programs across the country.

National Leadership Grants for Libraries

Sparks Grants

Opening Access to mid-20th Century Serials ([LG-74-17-0161-17](#)), Trustees of the University of Pennsylvania, \$25,000

The University of Pennsylvania Libraries will demonstrate and provide tools and data for opening access to the large body of scholarly and general serial literature from 1923-1963 that is in the public domain, but not freely accessible online. Though libraries hold many serials published after 1922 that are in the public domain and contain unique and valuable information for researchers, most have not been made available online due to the uncertainty and difficulty of establishing their copyright status. The project will result in a complete, searchable inventory of serials with issue and contribution renewals made between 1950 and 1977, as well as procedures for using the inventory and other data to decide whether a portion of a serial is in the public domain.

Reimagining the User Experience in Archives & Special Collections: Best Practices for Library Collaborations with Designers ([LG-74-17-0134-17](#)), Art Center College of Design, \$25,000

ArtCenter College of Design's College Library will develop and test best practices for archivists and librarians working with designers to develop digital tools and interfaces for archives and special collections. The project will bridge the disparate perspectives and vocabularies of librarians, archivists and technology designers with the aim of distilling essential expertise from both fields. The results, in the form of practical, easily understood pointers and sample work processes, will be shared in a national white paper and online content to be disseminated widely through targeted channels to the library and design sectors.

Reverse Engineering the Image Library: the Feasibility of Using Deep Learning to Identify Significance in a 35mm Slide Collection (LG-89-17-0218-17), Trustees of Columbia University in the City of New York, \$20,422

A team from the Media Center for Art History at Columbia University will apply image processing, deep learning, and optical character recognition (OCR) techniques to investigate methods for automated processing and data extraction from digitized 35mm slides to support archival discovery. The 35mm slide library, once the cornerstone of teaching art history at all levels, now languishes in storage, with valuable image resources trapped inside its drawers. This project aims to make these legacy collections accessible again, with the potential to increase available teaching resources, make significant images available for study, and to preserve the institutional memory and pedagogical history retained in these collections. They hope to discover techniques that will allow for less time-consuming and more cost-effective processing of legacy slide collections, enabling libraries across the country to partially automate the cataloging and identification of significant images.

Planning Grants

Assessing the Needs of Public Libraries towards Advancing the National Digital Platform (LG-72-15-0197-15), OCLC Online Computer Library Center, Inc., \$49,934

OCLC will work with the Digital Public Library of America, the Chief Officers of State Library Agencies, the Public Library Association, and Association for Library Collections & Technical Services to conduct a nationwide survey of public libraries and state library agencies. The survey will identify the extent to which public libraries have or have not digitized unique collections, the obstacles that are preventing digitization, and the opportunities and partnerships that can accelerate digitization. This one-year collaborative planning project will result in a report with data that will serve as a baseline for measuring the success of future work to increase public library participation

in the national digital platform. The findings and recommendations will also help public libraries, funders, service providers, and state library agencies determine how to work cooperatively to support the digitization of collections.

Beyond the Repository: Integrating Local Preservation Systems with National Distribution Services (LG-72-16-0135-16), Northwestern University, \$49,114

Northwestern University Libraries, in collaboration with the University of California San Diego Library, will explore issues related to the integration of local services with distributed preservation networks such as the Digital Preservation Network (DPN), Chronopolis, and the Academic Preservation Trust (APTrust). To ensure the research is useful to a range of institutions, a targeted group of organizations representing a variety of types of libraries, archives, museums, and preservation solutions, will be surveyed. The project team will explore questions related to topics including digital object curation, versioning and metadata in dark preservation systems, and interoperability of various systems, in order to develop broadly-applicable solutions and design patterns.

DADALytics: A Tool to Steer Digital Culture Heritage to the Semantic Web (LG-72-17-0179-17), Pratt Institute, \$49,650

The School of Information at Pratt Institute will develop a prototype of DADALytics, a modular tool that performs supervised entity extraction from archival documents for generating linked open datasets, lowering barriers to entry for institutions seeking to create linked open data from archival materials. This project will build on previous work to develop the Linked Jazz Transcript Analyzer, extending that tool's functionality and making it more widely available for use by other institutions. Grant funds will support the research and data gathering needed to inform the redesign and reengineering of the tool, including an environmental scan, a series of meetings with key stakeholders and the development of a prototype.

Digital Memory in Rural Tribal Libraries: A Program for Technology Training & Memory Gathering (LG-72-16-0113-16), Shift Design, Inc., \$48,743

Historypin, a free international platform for sharing culture and heritage, will work with tribal libraries in New Mexico and California to develop an online and in-person community memory program. The program will aim to build capacity, strengthen communities, and decrease social isolation through technology training and intergenerational programming around shared cultural heritage. The planning process will engage

a diverse group of communities, moving toward a simple and scalable digital program with training and evaluation modules that can be conducted within the limits of under-resourced rural tribal libraries. Project partners include the New Mexico State Library's Tribal Library Program and the University of California, Riverside, who will contribute to state-level planning and coordination activities.

Linking People: Developing Collaborative Regional Vocabularies ([LG-72-16-0002-16](#)), University of Utah, \$50,000

For libraries taking the first step into Linked Open Data (LOD), using controlled vocabularies is an essential part of creating new data structures linking people, places, collections, and digital objects together. The Western Name Authority File (WNAF) is a first step in collaboratively analyzing existing vocabularies, developing a data model, exploring infrastructure, and testing workflows that could be used throughout the Mountain West Digital Library network of partners. Building on existing work at the University of Utah of reconciling digital collection metadata fields against existing controlled vocabularies, this project explores creating a regional vocabulary in an open and shareable format using a process that can be replicated for other regions.

The Digital Atlas of Native American Intellectual Traditions: Creating a National Platform ([LG-72-15-0114-15](#)), Trustees of Amherst College, \$49,765

Amherst College, in conjunction with the Association of Tribal Archives, Libraries, and Museums, the Mukurtu project, and the Digital Public Library of America, will work together to develop a framework for sharing, exploring, and visualizing Native-authored library and archival collections. The project will bring together Native Studies scholars; Native librarians; tribal historians; representatives from libraries with large Native-authored collections; metadata, digital humanities, and user interface specialists; and technologists to expand and improve culturally appropriate access to Native digital collections and to create collaborative digital humanities scholarship that accurately represents Native American intellectual networks.

Virtual Reunification of Dispersed Archival Photographs: Adding Value to Large-Scale Digital Aggregations ([LG-72-15-0143-15](#)), University of Maryland, \$50,000

The University of Maryland's College of Information Studies, in partnership with the Maryland Institute for Technology in the Humanities, will use a planning grant to support a meeting to develop specific plans

for facilitating virtual reunification of dispersed photograph and image collections. The meeting will bring together archivists, technologists, humanists, and other stakeholders, with the ultimate goal of investigating virtual reunification as an additional social and technological service atop the basic aggregations provided by national-scale digital platforms.

National Forum Grants

Building for Tomorrow: Collaborative Development of Sustainable Infrastructure for Architectural and Design Documentation ([LG-73-17-0004-17](#)), President and Fellows of Harvard College, \$89,728

The Frances Loeb Library at the Harvard University Graduate School of Design will convene two priority-setting meetings for the preservation of born-digital architectural and design records. The meetings are intended to bring together a diverse set of libraries, architectural museums, archives, and other stakeholder communities to discuss and begin to develop the policies, procedures, and technical expertise necessary to support long-term preservation of architectural and digital design data. These data are particularly at risk of disappearing or becoming unusable because they are often developed with complex proprietary software. The meetings are intended to develop consensus for a path towards shared software preservation infrastructures to support the preservation of digital design and architectural information.

Community Standards for 3D Data Preservation (CS3DP) ([LG-88-17-0171-17](#)), Washington University, \$99,960

The Washington University in St. Louis Libraries, University of Iowa Libraries, and the University of Michigan Museum of Paleontology will hold two meetings titled "Community Standards for 3D Data Preservation" (CS3DP), to bring together stakeholders to work toward establishing shared standards, practices, and technologies for digital 3D data preservation, documentation, and dissemination. While some resources exist for learning how to create and work with 3D data, resources related to preservation are lacking. The first forum will bring together diverse experts from the community to explore digital 3D preservation topics and establish working groups. Between meetings, working groups will continue to engage online. In the second forum, participants will explore the working groups' solutions and agree on a roadmap for digital 3D preservation. The forums will produce a community-developed plan to move 3D preservation, documentation, and dissemination forward, will make recommendations for standards and best practices through a white paper, and will create a plan for sustaining these investments.

Developing a Framework for Measuring Reuse of Digital Objects ([LG-73-17-0002-17](#)), Council on Library and Information Resources, \$70,850

The Digital Library Federation (DLF) Assessment Interest Group will create a toolkit with resources, best practices, and use cases for studying the reuse of digital assets held by libraries. The project will engage stakeholders from a range of institutions and seek community input through activities including a formal needs assessment, focus group sessions, and surveys. The toolkit will facilitate adoption and standardization of measurement in digital libraries by promoting sustainable assessment techniques and best practices for communicating the impacts of digital collections. These resources will allow cultural heritage institutions to build stronger digital collections through a more nuanced understanding of their use.

Diversifying the Digital Historical Record: Integrating Community Archives in National Strategies for Access to ([LG-73-16-0003-16](#)), Amistad Research Center, \$100,000

The Amistad Research Center, in collaboration with the Shorefront Legacy Center, the South Asian American Digital Archive, Mukurtu, and the Inland Empire Memories Project of the University of California-Riverside, will use a National Forum grant to host a series of meetings that will focus on integrating community archives in the National Digital Platform. The four meetings will convene a diverse group of community archives curators and practitioners, community members, scholars, and digital collections leaders, to discuss broader inclusion of these materials in national digital collections. Outcomes of the project will include a summary white paper providing recommendations for increased representation of marginalized communities and people in our digital cultural heritage.

It Takes a Village: Open Source Software Models of Collaboration and Sustainability ([LG-73-17-0005-17](#)), LYRASIS Inc., \$100,000

LYRASIS will convene 60 stakeholders from open source software initiatives that serve cultural heritage organizations to identify characteristics and forms of sustainability models and factors affecting sustainability for open source software projects in the cultural heritage sector. Participants will represent a variety of open source initiatives at different stages in their evolution. The forum report will: document current practices for sustaining initiatives, create a sustainability roadmap to provide paths for planning and assessment, and provide a resource allocation guide for each phase of an open source software project's lifecycle. The forum

will result in recommendations to assess and strengthen sustainability for current and new open source software designed to serve cultural heritage organizations. It also will foster communication and share knowledge among diverse open source initiatives.

National Forum on Culturally Sensitive Practices and Data Curation ([LG-73-16-0126-16](#)), Northeastern University, \$98,822

The Northeastern University Library's Digital Scholarship Group will hold a series of meetings to inform and support the development of a teaching and learning toolkit focused on the handling of diversity within the design of information management systems, interfaces, and protocols. The toolkit will address topics including: the effects of tools and interfaces on interactions with documents and items, commonalities and differences between communities of users, and the influence of knowledge representation and other forces on the design of tools and interfaces. These issues will be discussed at an opening forum event, followed by a second meeting of a small design group to draft a toolkit of teaching and learning materials. Those materials will be circulated for public comment, and discussed in detail at a concluding open forum, whose results will be used to create a final version of the toolkit.

National Forum on Ethics in Web Archiving ([LG-73-17-0119-17](#)), Rhizome Communications, Inc., \$100,000

Rhizome, in collaboration with the University of California at Riverside Library (UCR), the Maryland Institute for Technology in the Humanities (MITH), and the Documenting the Now project, will design and host a National Forum on Ethics in Web Archiving. The three-day meeting will convene many stakeholder groups, including representatives from libraries, archives, and museums, socially engaged artists, activists, and members of community organizations, and interdisciplinary practitioners such as social media researchers and lawyers. Participants will discuss the ethical challenges, both technical and social, involved in archiving the web and social media. Following the forum, a best practices white paper and proceedings will be published.

National Strategy for Shareable Local Authorities ([LG-73-16-0040-16](#)), Cornell University, Inc., \$98,484

Cornell University Library, in partnership with the Library of Congress, OCLC, the Program for Cooperative Cataloging, the ORCID organization, the Coalition for Networked Information, the Social Networks and Archival Context Cooperative, the BIBFLOW project, Stanford University Library and Harvard Library will hold a national forum on issues concerning

local name authorities. Name authority files provide unique identifiers and records for people to ensure consistency in creation of descriptive metadata.” Libraries create local authorities to serve a variety of purposes, usually within an institutional context; but these authorities have significant potential for reuse at other cultural heritage organizations and beyond. The April 2015 IMLS National Digital Platform Forum report emphasized the importance of enabling technologies (e.g., interoperability via linked data) and radical collaborations in supporting the mission of the cultural heritage sector. By facilitating a national forum, we plan to identify solutions for facilitating the creation of more shareable authorities.

The Software Preservation Network ([LG-73-15-0133-15](#)), Cal Poly Corporation, \$99,131

California Polytechnic State University, in partnership with the University of Texas at Austin, will run a one-year planning and research project that will culminate in a forum on software preservation in support of cultural heritage organizations missions. The forum will solicit community input and build consensus around future steps for a national strategy for software preservation. The project team and partners will work to identify potential partners, explore licensing issues, gather empirical evidence for the need for software preservation, draft technical architecture specifications, and develop plans for sustaining a national effort. These activities will be in service of building community consensus on the best software preservation organizational model, to be implemented after this planning project.

Project Grants

A Re-enactment Tool for Collections of Digital Artifacts ([LG-70-16-0079-16](#)), Rhizome Communications, Inc., \$169,970

Rhizome, an international born-digital art organization, in partnership with Yale University and the University of Freiburg, will enhance a set of software tools connecting archives of digital artifacts and emulation frameworks. The project will greatly increase the viability of emulation as a preservation strategy by making environments of legacy software manageable for collection managers. This proposed project responds to the disparity between the proven viability of emulation as a digital preservation strategy and the practical needs of collection managers.

Avalon Media System: Integrating Audiovisual Collections with Research, Digital Preservation, and a Sustainable Developer Community. ([LG-70-17-0042-17](#)), Northwestern University, \$967,088

Northwestern University Library, in partnership with Indiana University Libraries, will work to increase adoption and ensure sustainability of the open source Avalon audiovisual repository system. The project will work closely with the Hydra community to engage developers, as well as create and implement a cloud-hosted service model for Avalon. It will also integrate the platform with several scholarly tools and media preservation systems, such as the Digital Preservation Network, Archivematica, and the International Image Interoperability Framework. This work will facilitate easier adoption of the platform by a variety of institutions while also adding key features to increase Avalon’s functionality.

BHL Expanding Access to Biodiversity Literature ([LG-70-15-0138-15](#)), New York Botanical Garden, \$846,457

The New York Botanical Garden, Harvard Ernst Mayr Library of the Museum of Comparative Zoology, Missouri Botanical Garden, and Smithsonian Institution Libraries, as part of the Biodiversity Heritage Library (BHL), will work to position BHL as an on-ramp for biodiversity content providers interested in contributing to the national digital library infrastructure through the Digital Public Library of America. The project will work to: 1) expand public access to biodiversity literature; 2) onboard at least one hundred new small organizations (libraries, museums, societies and publishers) into providing content through the network; 3) serve as a model for national “subject-based” content hubs; and 4) develop processes that will ensure long-term biodiversity contributions to the Digital Public Library of America. Project activities will include training and quality control for content providers, national outreach to engage the broader community, and system enhancements to BHL’s existing digital infrastructure.

Bridge2Hyku Toolkit: Developing Migration Strategies for Hydra-in-a-Box ([LG-70-17-0217-17](#)), University of Houston System, \$249,103

The University of Houston Libraries, in collaboration with Stanford University, DuraSpace, Indiana University and the Digital Public Library of America, will develop a toolkit to help institutions accomplish complex system migrations. Focusing primarily on migrations from CONTENTdm to Hyku, the toolkit will allow institutions to better understand their digital library ecosystems and how they can prepare for migration. It will include content such as documentation on the theoretical approaches to migration, instructions on how to conduct a needs assessment based on analyzing metadata structures and understanding system requirements, best practices for preparing repository data for migration, and specialized tools to assist users

with migration to Hyku.

Building a Gazetteer of Anthropocene North America (LG-70-16-0056-16), Alexandria Archive Institute, \$249,920

The Digital Index of North American Archaeology (DINAA) project aggregates archaeological and historical data from state and tribal governmental authorities that manage North American cultural resources east of the Mississippi River. This project will expand DINAA to encompass the remainder of the United States, building rich chronological, legal, and environmental metadata for between two and three million archaeological sites. This work will contribute to the national digital platform by providing researchers, museums, libraries, government offices, and members of the public the largest and most comprehensive Linked Open Data gazetteer of historical and archaeological sites in the United States. Curating these data will improve government-to-government relationships needed by sovereign tribal nations to effectively manage and protect ancestral cultural heritage.

Cobweb: A Collaborative Collection Development Platform for Web Archiving (LG-70-16-0093-16), Regents of the University of California, \$244,894

The California Digital Library, in partnership Harvard Library and UCLA Library will develop Cobweb, an open-source collaborative collection development platform for creating comprehensive Web archives by coordinating the activities of the Web archiving community. The project consists of four coordinated and complementary activities: developing the open source Cobweb system; user interface design and usability testing; community outreach and engagement; and production deployment. The shared curatorial decision-making enabled by Cobweb will benefit the libraries and archives already engaged in Web archiving as well as those that have not yet started, and it will help them make better informed decisions regarding the allocation of their finite resources. As a tool for managing our digital heritage, Cobweb furthers IMLS's efforts towards developing a national digital platform.

Content Contribution Network for the Digital Public Library of America (LG-70-15-0002-15), ARTstor, \$749,418

ARTstor, in collaboration with the El Paso Museum of Art, the Museo de Arte de Ponce in Puerto Rico, the Philadelphia Museum of Art, the Staten Island Museum and the Digital Public Library of America (DPLA), will create and implement software to enable museums to contribute digital image collections for open public access. The project will lower barriers

to museum contributions to the DPLA by producing enhanced metadata tools, intellectual property rights decision support tools, and a direct-to-DPLA publishing capacity. Once complete, the service will improve the discoverability of museum collections, provide an efficient open network via the DPLA and other digital initiatives, and enhance library holdings by providing additional context for patrons.

Email: Process, Appraise, Discover, Deliver - ePADD: Phase 2 (LG-70-15-0242-15), Leland Stanford Junior University, The, \$685,129

Stanford University Libraries, with partners University of Illinois Urbana-Champaign, Harvard University, University of California, Irvine, and Metropolitan New York Library Council, will significantly improve ePADD, an open-source software package that supports archival processes around the appraisal, ingest, processing, discovery, and delivery of email archives. Email archives present a singular window into contemporary history; however, they are often inaccessible to researchers due to screening, processing, and access challenges, as well as the sheer volume of material. The first phase of development was a proof-of-concept for using natural language processing, automated metadata extraction, and other batch processes to support archival workflows and provide access to otherwise hidden cultural heritage materials. This second phase of development will seek to greatly expand the program's scalability, usability, and feature set. Broad adoption of ePADD will be promoted through stakeholder interviews, expanded user testing, UI enhancements, and community engagement.

Fostering a New National Library Network through a Community-Based, Connected Repository System (LG-70-15-0006-15), Digital Public Library of America (DPLA), \$1,999,897

The Digital Public Library of America (DPLA), Stanford University, and DuraSpace will foster a greatly expanded network of open-access, content-hosting "hubs" that will enable discovery and interoperability, as well as the reuse of digital resources by people from this country and around the world. At the core of this transformative network are advanced digital repositories that not only empower local institutions with new asset management capabilities, but also connect their data and collections. Currently, DPLA's hubs, libraries, archives, and museums more broadly use aging, legacy software that was never intended or designed for use in an interconnected way, or for contemporary web needs. The three partners will engage in a major development of the community-driven open source Hydra project to provide these hubs with a new all-in-one solution, which will also allow countless other institutions to easily join the national

digital platform.

Historical Newspapers in Hydra: Building a Platform to Restore Access to Cultural Treasures (LG-70-17-0043-17), University of Utah, \$249,999

The J. Willard Marriott Library at the University of Utah and the Boston Public Library will collaborate to improve the ability of libraries to provide access to digitized historical newspapers. Specifically, the project focuses on better ways for libraries to provide article level access to digitized newspapers. This work supports the needs of both the general public and scholars who use this content. The project will produce three outputs: 1) an open data model addressing structural and descriptive metadata features unique to digitized newspapers; (2) a set of modular, open-source plugins for the popular Hydra/Fedora open source digital repository framework for ingesting, describing, discovering, displaying, and disseminating digitized newspaper content; and (3) establishing a community of practitioners - including developers, librarians, content specialists, and managers - dedicated to addressing challenges and collaborating on best practices associated with providing access to digitized newspapers.

Implementing ACCESS: Guiding the Creation, Preservation, and Use of Electronic Records (LG-70-17-0196-17), Council of State Archivists, \$210,240

The Council of State Archivists (CoSA) will gather, develop, and share best practices and guidance materials to improve creation, management, preservation, and use of permanent state government digital records and information. CoSA will collaborate with the National Governors Association (NGA), the National Association of State Chief Information Officers (NASCIO), the National Association of Secretaries of State (NASS), and the Chief Officers of State Library Agencies (COSLA), as well as content creators in state government and users of government data, to help improve preservation and use of permanent state government electronic records. The project will result in the publication of five collaborative reports, ten case studies on electronic records or digital preservation issues, six webinars, and engagement with stakeholders through articles, conference presentations, and focus groups.

Modules to Describe and Share Omeka S Resources (LG-70-15-0258-15), George Mason University, \$249,337

The university's Roy Rosenzweig Center for History and New Media will extend the core functionality of Omeka-S by more fully integrating linked open data in digital collections, and creating new modes of access and dissemination through other platforms. The center will develop and support several deliverables:

a basic resource description template; three linked open data and controlled authority modules; a social media sharing module; and several developer training workshops. Key outcomes include increasing the integration of LOD authority files in metadata for digital collections; the ability of cultural heritage organizations to implement their own local controlled authorities; the likelihood that new metadata for digital collections can be smoothly transferred to key aggregators of the national digital platform; the ease of circulation for digital cultural heritage collections through web and social media platforms; and the technical capacity of library, archive, and museum staff.

Mukurtu Hubs and Spokes: A Sustainable National Platform for Community Digital Archiving (LG-70-16-0054-16), Washington State University, \$641,832

Washington State University will extend the functionality of the free and open source platform Mukurtu, a content management system and community archive platform built with indigenous communities to manage and share digital cultural heritage. Working with partners including the University of Hawaii's Department of Linguistics, the Alaska Native Language Archives, the University of Oregon Libraries, the University of Wisconsin, the Wisconsin Library Services, and Yale University's Beinecke Rare Book and Manuscript Library, WSU will create a set of national Mukurtu Hubs. Hubs will contribute to the ongoing development and deployment of the platform, as well as provide training and support to tribal archives, libraries, and museums. The project will expand the reach of the software and ensure its sustainability.

Periods, Organized (PeriodO) 2: Linking, Discovering, and Reconciling Information about the Past (LG-70-16-0009-16), University of Texas at Austin, \$237,744

The University of Texas at Austin will significantly expand the usefulness of the PeriodO platform and dataset beyond archaeology to meet the needs of a broader audience of librarians, data managers, scholars, and students across the academic spectrum. Over the course of this two - year phase, the project will complete a set of visualization tools for searching and filtering in the graphic user interface and provide workshops with partners from a wide range of disciplines such as modern history, literature, library science, and museum studies, to explore the role PeriodO might play in the management and discoverability of their data.

The Indigenous Digital Archive: Building Effective Access to and Collaboration with Mass-Digitized Archival (LG-70-16-0047-16), Museum of New Mexico Foundation, \$249,858

The State of New Mexico's Museum of Indian Arts and Culture, in collaboration with the New Mexico State Library Tribal Libraries Program and the Indian Pueblo Cultural Center, will create tools to extend the capacities of Omeka-S, a widely-used open source content management system. The suite of architectural and interactive features will include the translation of images stored in Omeka-S to the International Image Interoperability Format (IIIF), and enhanced tools for user tagging and annotations. Code for the tools will be shared openly on GitHub and with the Omeka-S community. The project will also result in the development of a model use case, demonstrating the technical and community impacts of the tools. A fellowship program will support the participation of individuals from New Mexico's Native communities in the development of the model use case.

Research Grants

Combining Social Media Storytelling with Web Archives (LG-71-15-0077-15), Old Dominion University Research Foundation, \$468,618

Old Dominion University and the Internet Archive will collaborate to develop tools and techniques for integrating "storytelling" social media and web archiving. Services such as Archive-It (archive-it.org) allow libraries, archives and museums to develop, curate, and preserve collections of web resources. At the same time, storytelling is becoming a popular technique in social media for selecting representative tweets, videos, web pages, etc. and arranging them in chronological order to support a particular narrative or "story." Tools such as Storify (storify.com) provide an easy interface for users to arrange web resources to create a story. The partners will use information retrieval techniques to (semi-)automatically generate stories summarizing a collection and mine existing public stories as a basis for librarians, archivists, and curators to create collections about breaking events.

Extending Intelligent Computational Image Analysis for Archival Discovery (LG-71-16-0152-16), Board of Regents of the University of Nebraska, \$462,317

The Image Analysis for Archival Discovery (Aida) research team at the University of Nebraska-Lincoln will investigate the use of image analysis as a methodology for content identification, description, and information retrieval in digital libraries and other digitized collections. The project will focus on identifying poetic and advertising content in digitized historic newspapers. Using a machine learning approach, the project will result in an intelligent computational system that can process digital images and identify these specific types of content. The tools and methodologies

produced will improve libraries' capacity to identify digital content at and below the item level, and increase access to information currently obscured in large digital collections.

Improving Access to Time-Based Media through Cataloging Tools (LG-71-15-0208-15), WGBH Educational Foundation, \$898,474

WGBH, in partnership with Pop-Up Archive, will address the challenges faced by many libraries and archives trying to provide better online access to their media collections. This 30-month research project will explore and test technological and social approaches for metadata creation by leveraging scalable computation and engaging the public to improve access through crowdsourcing games for time-based media. The project will support several related areas of research and testing, including: speech-to-text and audio analysis tools to transcribe and analyze almost 40,000 hours of digital audio from the American Archive of Public Broadcasting; open source web-based tools to improve transcripts and descriptive data by engaging the public in a crowdsourced, participatory cataloging project; and creating and distributing data sets to provide a public database of audiovisual metadata for use by other projects.

Improving Fedora to Work with Web-scale Storage and Services (LG-71-17-0159-17), University of Maryland, \$240,139

The Digital Curation Innovation Center at the University of Maryland's iSchool will research, develop, and test software architectures to improve the performance and scalability of the Fedora repository. This project will create a new Fedora implementation without current performance bottlenecks relating to storage size, enabling institutions to manage Fedora repositories with petabyte-scale collections. It will apply the new Fedora 5 application programming interface (API) to a repository software stack called DRAS-TIC. Fedora community partners will be engaged to help develop use cases and performance expectations. The project will produce open source software, tested system configurations, documentation, and best-practice guides.

OSSArcFlow: Researching Archiving Workflows for Born-Digital Content (LG-71-17-0016-17), Educopia Institute, \$681,178

The Educopia Institute, in partnership with the School of Library Sciences at the University of North Carolina Chapel Hill, will work to investigate, model, and test workflows for born-digital content curation in libraries and archives. Specifically, the project focuses on integration and interoperability of three open source

digital library tools (BitCurator, Archivematica, and ArchivesSpace) and to support partner institutions in integrating these tools into their workflows. To accomplish this work, the project will support and study implementation of these tools across 12 partner institutions - Robert W. Woodruff Library, District of Columbia Public Library, Duke University, Emory University, Kansas Historical Society, Massachusetts Institute of Technology, Mount Holyoke College, New York Public Library, New York University, Odum Institute, Rice University, and Stanford University. Working across these different institutional contexts, the project focuses on two core applied research questions. How can institutions combine tools to support workflows that meet local institutional needs? How can institutions implement “handoffs” between different function-based systems?

Programmatic Extraction of “Documents” from Web Archives (LG-71-17-0202-17), University of North Texas, \$318,988

The University of North Texas Libraries and the Computer Science and Engineering Department will research the efficacy of using machine-learning algorithms to identify and extract publications contained in web archives. The overarching goal of this project is to understand if machine-learning models can successfully identify content-rich PDF and Word documents from web archives that align with library and archives collecting plans. The researchers are working in two phases. They are first increasing their understanding of the workflows, practices, and selection criteria of librarians and archivists through ethnographic-based observations and interviews. Next, this increased understanding informs the use of novel machine-learning techniques to identify content-rich publications collected in existing web archives. Identifying these documents will empower libraries, archives, and museums to meet their curatorial missions.

Systems Interoperability and Collaborative Development for Web Archiving (LG-71-15-0174-15), Internet Archive, \$353,221

The Internet Archive, working with partner organizations, University of North Texas, Rutgers University, and Stanford University Library will undertake a two-year research project to explore techniques that can expand national web archiving capacity in several areas. The project aims to build a foundation for collaborative technology development, improved systems interoperability, and an Application Programming Interface (API) based model for enhanced access to, and research use of, web archives. The

project will outline successful community models for cooperative technology development work; it will prototype and test API-based interoperability; and it will explore how interoperability can enable new access models, improve discoverability, and expand shared digital services. In working with the Archive-It platform, now used by more than 350 partner institutions, results of this research will be directly applicable to libraries, archives, and museums around the country and the world.

Transforming Libraries and Archives through Crowdsourcing (LG-71-16-0028-16), Adler Planetarium, \$1,214,780

The “Transforming Libraries and Archives through Crowdsourcing” project, a research partnership between Adler Planetarium’s Library and researchers at Oxford University, will greatly expand the capacity for libraries and archives across the country to use crowdsourcing techniques to engage with audiences and improve access to digital collections through the Zooniverse. The Zooniverse, an international crowdsourcing organization with 1.4 million volunteers, is poised to serve as a transformative element in the future of library and archive engagement efforts and as a core component of the national digital platform. Through this effort, the team will develop a series of library/archive Zooniverse projects that explore improvements to full text and audio transcription and image annotation crowdsourcing tools and research differences between transcribing in isolation versus with knowledge of others’ transcription. Lessons learned from these projects will be incorporated into the Project Builder, which enables anyone to build a crowdsourcing project for free.

This appendix includes abstracts for all funded projects in the “Opening Scholarly Communications” focal area, including those that were highlighted above.

Laura Bush 21st Century Librarian Program

Planning Grants

Curating for Reproducibility (CURE) Consortium ([RE-87-17-0074-17](#)), University of North Carolina At Chapel Hill, \$49,820

The Odum Institute at the University of North Carolina, the Institution for Social and Policy Studies at Yale University, and the Cornell University Institute for Social and Economic Research will plan the development of an evidence-based librarian and archivist training program focused on data curation for reproducibility. As the role of librarians in research grows quickly, formal education curricula cannot always keep up. This grant supports steps toward the development of a Data Curation for Reproducibility (Data CURE) continuing education program to help fill gaps in the current skillsets of librarians and archivists who are adapting their roles to support reproducible research. The planning project will consist of four primary activities: an environmental scan, the development of a curricular framework, strategic planning, and community engagement.

Planning Research Data Services in Academic Libraries: Designing a Conceptual Services Model based on Patron Needs Assessment ([RE-32-16-0140-16](#)), University of Kentucky, \$49,844

Through an IMLS planning grant, the University of Kentucky will conceptualize a research data services model for academic libraries based on a patron needs assessment. The project team will conduct a multi-method study to investigate the current status of research data services, needs of potential patrons, and perceptions and opinions of heterogeneous stakeholders, such as librarians, administrators, and scholars. The expected outcomes include: a list of potential data services feasible in operating libraries, situations in which patrons need research data services, resources needed to offer data services, knowledge and skills needed by data services librarians, curricula suggestions for data-related LIS programs, and others. In particular, a conceptual data services model will be produced, which will identify types of data services, associated resources necessary for services, service platforms, knowledge and skills needed by librarians, and corresponding librarian education plans. In addition, this project will yield guidelines for data

services librarian training and suggest curricula for library science programs.

National Forum Grants

The Data Scientist as the 21st Century Librarian? ([RE-43-16-0149-16](#)), University of Pittsburgh, \$97,911

Through a national forum, the University of Pittsburgh School of Information Sciences will convene a group of experts from inside and outside the library community to articulate a vision and roadmap for data science in libraries. The project’s goal is to coalesce disparate communities with a range of experiences and perspectives on data science in support of developing and sustaining the National Digital Platform. The project focuses on both skills and management gaps by bringing together diverse constituencies to discuss opportunities for coordination and collaboration. The project aims to articulate a vision for data science in libraries, develop a roadmap for continuing education in data science for librarians, and provide guidance for library administrators managing data-intensive teams. Overcoming these gaps is crucial for connecting and interconnecting libraries to the other domains already transformed by data science.

Project Grants

ARL Fellowship for Digital and Inclusive Excellence ([RE-85-17-0037-17](#)), Association of Research Libraries, \$518,507

The Association of Research Libraries (ARL) will implement the ARL Fellowship for Digital and Inclusive Excellence, a national diversity recruitment and development program. The program will provide one-year paid internships in libraries and archives to 30 undergraduate and graduate students from historically underrepresented racial and ethnic minority groups. The project will also provide numerous continuing education opportunities for the fellows to explore careers in libraries and archives, as well as training in diversity, equity, and social justice topics. Students will receive mentorship opportunities and leadership development in addition to their one-year internship positions, paving the way for successful careers for the individual fellows and a more diverse workforce for the library and archives fields.

Developing a Curriculum to Advance Library-Based Publishing ([RE-40-16-0150-16](#)), Educopia Institute, \$205,726

Educopia Institute and the Library Publishing

Coalition will design and implement a competency-based curriculum for library publishing that includes synchronous and asynchronous professional development opportunities for librarians. Library publishing is a new field that has emerged to address demands for publishing platforms and services that support the production and dissemination of scholarship, including websites, e-journals, textbooks, and other open education resources, conference proceedings, digital humanities projects, theses, monographs, and other work. The project team will train 60 librarians; help 10 libraries launch or enhance publishing services; integrate materials into at least one graduate course in library and information science; and develop curriculum featuring instructional videos, readings, process maps, case studies, tips, and model documents to help guide librarians through the publishing process.

Digging Deeper, Reaching Further: Libraries Empowering Users to Mine the HathiTrust Digital Library Resources (RE-00-15-0112-15), University of Illinois, \$398,844

Librarians and digital humanities scholars from the University of Illinois in partnership with colleagues at Indiana University, Northwestern University, Lafayette College, the University of North Carolina, and the HathiTrust Research Center will develop a shared curriculum for use in academic libraries and a train the trainer series designed to assist librarians in getting started with the tools, services, and related research methodologies of the HathiTrust Research Center (HTRC). The project will help to establish academic libraries as a learning space for encountering the “big data” tools and methodologies. To this end it will work to provide librarians with new content for instructional services while also empowering them to become active research partners on digital projects at their institutions.

Expanding Library Carpentry in the US (RE-85-17-0121-17), Regents of the University of California, \$249,553

The California Digital Library will advance the scope, adoption, and impact of the emergent “Library Carpentry” continuing education program. Librarians and archivists have an increasingly important role to play in mediating access to and use of information technologies and resources integral to 21st century culture, commerce, and scholarship. This requires librarians and archivists to remain current with the rapidly evolving information landscape, particularly with regard to computational and data-driven methods. The training opportunities enabled by the project will provide librarians with the critical data and computational skills and tools they need to be

effective digital stewards for their stakeholders and user communities. The two-year project focuses on: development of a core curriculum of training modules optimized for librarian instruction; regionally-organized training opportunities for librarians; and outreach to promote the development of a broad, engaged community to sustain and advance the movement beyond the end of this grant.

LIS Education and Data Science for the National Digital Platform (LEADS-4-NDP) (RE-70-17-0094-17), Drexel University, \$313,269

Drexel University will develop the Library Education And Data Science (LEADS) program, a transformative doctoral training initiative grounded in library science foundations and integrating a new data science focus. The program will provide stipends for 18 library school doctoral students across the country. These LEADS Fellows will complete an online preparatory curriculum, an intensive 3-day data science boot camp at Drexel University, and a ten-week data science internship with a LEADS project partner in which the students will complete data science activities in a real-world library setting while conducting original research. The program will result in a cohort of future faculty members who can bring data science knowledge and skills into library graduate schools across the country. The chief outcome of the program will be a proven template for educating library data scientists, while also readying this first cohort to serve as educators and leaders in libraries and archives.

National Leadership Grants for Libraries

Sparks Grants

Medical Libraries of the Future: Creating a Primer on How to Design a Virtual Reality Studio (LG-74-17-0190-17), University of Washington, \$25,000

The University of Washington Health Sciences Library will plan, design, build, test, and assess a Virtual Reality (VR) and Augmented Reality (AR) program and studio for medical professionals in a health sciences library environment. They will then develop a “how to” primer for other libraries across the country. With this primer, medical and research libraries will be able to design, plan, implement, and evaluate VR and AR studios for healthcare team use in an easy to understand format. Since scholarly and medical literature are now almost entirely digital, providing the space, technology, and expertise for using VR and AR equipment can allow medical libraries to bring researchers and clinicians back into the library space.

Planning Grants

Consortia Collaborating for a Platform on Library Usage

Statistics (CC-PLUS) ([LG-72-17-0053-17](#)), Pennsylvania Academic Library Consortium, Inc., \$50,000

The Pennsylvania Academic Library Consortium (PALCI) in partnership with the Virtual Library of Virginia the University System of Maryland, the Statewide California Electronic Library Consortium and California Digital Library will plan and pilot a modular open technology platform for the collection, display, and analysis of consortial library usage data. This project aims to increase consortia and libraries' economies of scale by further developing a community of interest in this area. It will increase collaboration on issues related to library usage data challenges, joint vendor problem resolution, and community-based technical development. The availability of a standards-based usage data platform for library consortia will result in libraries and consortia positioned to serve as exemplary stewards, empowered to make evidence-based decisions and better informed investments in electronic resources.

Designing OER To Prepare the Next Generation of Scholarly Communication Librarians ([LG-72-17-0132-17](#)), North Carolina State University, \$49,808

The North Carolina State University Libraries, University of Kansas Libraries, and University of Illinois Urbana-Champaign School of Information Sciences are exploring the need for, and ideal components of, an open educational resource (OER) for teaching library students and professionals about scholarly communication. Scholarly communication is recognized as a core competency for librarianship but there is currently no unified educational resource available for training and continuing education. Scholarly communication is interdisciplinary and quickly evolving, which makes it difficult to create a standard commercial textbook. In consultation with many stakeholders, the project team will design and conduct a nationwide survey and workshop to engage directly with the two central stakeholder groups: library school instructors and scholarly communication experts. These activities will identify the extent to which an OER is needed, the components of the OER, the potential obstacles to its adoption, and the partnerships and promotional activities that would accelerate its use.

Library Capacity Assessment and Development for Big Data Curation ([LG-72-17-0139-17](#)), Trustees of Indiana University, \$49,773

Researchers at the School of Informatics and Computing at Indiana University Indianapolis and Indiana University Bloomington will work toward the development of a conceptual framework for assessing libraries' capacity for big data curation. This planning

grant will provide a research-based foundation for a future project to develop a big data curation capacity assessment toolkit that would be freely available to libraries across the country. The conceptual framework will be informed by three specific research activities: systematic literature review, online survey, and in-person focus groups. Research findings will provide informative sources for academic and public libraries that are interested in or are planning sustainable and scalable big data curation programs. It will assist library staff in understanding their current environments as well as potential impediments to building successful curation programs.

Open Textbook Toolkit ([LG-72-17-0051-17](#)), North Carolina State University, \$49,958

North Carolina State University Libraries in collaboration with the American Psychological Association, the University of North Carolina Press, the Student Public Interest Research Groups, the Open Textbook Network, and the new preprint service PsyArxiv, will explore the development of a strategy to use open educational resources (OERs) in psychology classrooms. Specifically, the project will gather information about the practices and needs of psychology instructors who may consider adopting or creating OERs. Project findings, recommendations, and a scalable "toolkit" will assist a broad range of scholars, instructors, librarians, and publishers to better understand how to support subject matter experts in the creation and adoption of OERs.

Research Data & Software Preservation Quality Tool ([LG-72-16-0122-16](#)), University of Notre Dame Du Lac, \$45,590

The University of Notre Dame's Hesburgh Libraries will conduct a planning effort with support from the Center for Open Science (COS) and a range of additional stakeholders to address needs for preserving data and software. The goal is to collaboratively design an interoperable and repository agnostic Data and Software Preservation Quality Tool. The planning process will consider existing solutions to better represent digital workflow methodologies, improve data and software provenance, automatically enhance metadata, perform schema validation, improve file format recognition, interoperability, data integrity, and ultimately facilitate reproducibility. Information gathered during panels, workshops, and meetings will be preserved and shared transparently using a free online presentation sharing service. This input will form the basis for a collaboratively authored planning report which will include detailed technical and administrative project plans.

Towards engaging researchers in research identity data curation (LG-73-16-0006-16), Florida State University, \$49,950

The Florida State University's collaborative planning project addresses the IMLS priority of establishing a shared national digital platform. It will explore researcher participation in research identity management systems. In particular, it will examine researcher perceived value of research identity metadata, motivations to participate in and commit to online research identity management systems, and contribute to research identity data curation. The National Digital Platform proposed by the IMLS community, in addition to shared content, software, and hardware modules, may need to provide shared research-based knowledge for effective design, configuration, and management of those resources. A shared design knowledge base is necessary to design effective access to library resources, to recruit users, to build communities around those resources, and to engage them in library events and activities, which may include the curation of research identity and authority data. This project will contribute towards that need.

National Forum Grants

Always Already Computational: Library Collections as Data (LG-73-16-0096-16), University of California, Santa Barbara, \$100,000

The University of California Santa Barbara will hold a series of meetings to develop strategies around library collections that support computationally-driven research and teaching. Partner organizations include University of Pennsylvania, University of North Carolina Chapel Hill, Penn State University, Emory University, and Texas A&M University, and meeting attendees will include librarians, archivists, museum professionals, technologists, researchers, and practitioners. The project will lead to the creation of a framework to support library collections as data, the identification of methods for making computationally-amenable library collections more discoverable, use cases and user stories for such collections, and guidance for future technical development.

Developing Library Strategy for 3D and Virtual Reality Collection Development and Reuse (LG-73-17-0141-17), Virginia Polytechnic Institute and State University, \$95,024

Team members at Virginia Tech, Indiana University, and the University of Oklahoma will organize meetings to develop a roadmap and white paper for library adoption of Three Dimensional (3D) and Virtual Reality (VR) services. Lower costs and greater computational power have made 3D and VR technologies financially realistic

for a broad variety of institutions. Many academic libraries have developed archives for other forms of research data, but there is an absence of standards and best practices for producing, managing, and preserving 3D and VR content. This gap is an information management problem suited to the strengths of libraries and can benefit librarians and researchers alike across institutions. The team will host three national forums, each on a different 3D and VR theme: content creation and publishing, visualization and analysis, and repository practice and standards.

IMLS National Forum: Data Mining Research Using In-copyright and Limited-access Text Datasets: Shaping a Research and Implementation Agenda for Researchers, Libraries, and Content Providers (LG-73-17-0070-17), University of Illinois, \$99,536

Faculty and staff from the University of Illinois at Urbana-Champaign's Library and School of Information Sciences will bring together library, researcher, and content provider stakeholders to discuss and recommend a research, policy, and practice framework to address how to provide scholars access to protected texts for data mining and other analyses. Text data mining and analysis has emerged as an important research method for scholars. However, researcher efforts to access and analyze datasets are frequently complicated when texts are protected by copyright or other intellectual property restrictions. Following the forum, the team will produce a white paper to synthesize the results of the meeting and to present best practices and policy suggestions to the larger library community.

Project Grants

Fedora 4 API Extension (API-X) Architecture (LG-70-16-0076-16), Johns Hopkins University, \$120,500

The Sheridan Libraries at Johns Hopkins University will develop a service proxy layer on top of the Fedora 4 software platform that will facilitate the exposure of repository contents as linked data web resources. There is an existing user base of Fedora software for institutional repositories that will grow given the important enhancements and robustness offered by Fedora 4. By providing architecture to deploy repository services as lightweight extensions, institutions that use Fedora 4 for their institutional repository needs would be automatically positioned to extend their platforms for more robust data management. As federal funding agencies respond to the White OSTP memoranda regarding public access to publications and data, it is becoming clear that simply depositing and subsequently downloading data will not be sufficient. The proposed work supports a vision of data management where data are packaged with information graphs that capture and

preserve connections to publications and software.

Mapping Manuscript Migrations (LG-00-17-0102-17), Trustees of the University of Pennsylvania, \$172,621

The Mapping Manuscript Migrations project brings together researchers from the University of Pennsylvania in the U.S., Finland, France and the United Kingdom. The project will use Linked Open Data standards to digitally connect premodern manuscripts from Europe and North America. By linking diverse sources of data, the project aims to carry out large-scale analyses and visualizations of the history of these manuscripts. The project team hopes this coherent, interoperable infrastructure will allow researchers to ask new kinds of questions at a scale never before possible. This award supports the U.S. team's participation. International partner organizations are supported through awards made by funders in their respective countries.

Scaling Up Perma.cc: Ensuring the Integrity of the Digital Scholarly Record (LG-70-16-0023-16), President and Fellows of Harvard College, \$782,649

The Harvard Law School Library Innovation Lab, in cooperation with the Berkman Center for Internet & Society and over 130 partner libraries will sustainably scale a tool - Perma.cc - to combat link rot in all scholarly fields. Link rot happens when a hyperlink on a webpage points to a website or online resource that is no longer available. It is a serious problem affecting as much as 70 percent of all scholarly articles in law, medicine, science, and technology, causing irreversible harm to the digital scholarly record. Building on solutions and approaches developed in the field of legal scholarship, this project will grow the Perma library coalition and tackle link rot in other fields. Through this project, the team will scale a proven technology and approach sustainably by designing, testing and launching a service that can subsidize the services offered to those supported by academic library partners.

SHared Access Research Ecosystem (SHARE) Notification System (*LG-00-14-0037-14), Association of Research Libraries, \$1,108,050

The SHARE (SHared Access Research Ecosystem) project is a community-based effort anchored in three higher education associations: Association of Research Libraries, Association of American Universities and Association of Public and Land-Grant Universities. SHARE will build a Notification System as a metadata store, or digest, of research release events (e.g., the release of publications, presentations, datasets, and other output from research projects) from existing but disparate sources. The SHARE Notification System will

be a structured way to report and notify parties of the research release events that interest them, such as the publication of a paper funded by a specific granting body, a presentation by a researcher at a specific university, or the submission of a dataset related to a specific grant award. Interested parties could either subscribe to the Notification System based on criteria of interest (grant, agency, university, or date range), or query a dashboard to create reports. The technical development of the Notification System will leverage to the greatest extent possible existing code, frameworks, and vocabulary.

*Note: although this grant was initially awarded in FY2014, the majority of the award amount was supplemented in FY2015.

Research Grants

Data Capsule Appliance for Research Analysis of Restricted and Sensitive Data In Academic Libraries (LG-71-17-0094-17), Trustees of Indiana University, \$320,546

Indiana University, in partnership with eight other academic libraries, will enable new kinds of computational research while ensuring librarians remain expert stewards of information collections. In the last decade, there has been a nearly exponential increase in the volume of digital content, much of which could be valuable for computational research. However, not all datasets can be made open to researchers due to copyright and privacy concerns. The "data capsule" technique was developed in the HathiTrust Research Center to enable researcher access to protected digital collections. This project will develop the data capsule technique as a service for use in academic libraries across the country.

Developing Library Cyberinfrastructure Strategy for Big Data Sharing and Reuse (LG-71-16-0037-16), Virginia Polytechnic Institute and State University, \$308,175

Virginia Tech Libraries, in partnership with the departments of Mechanical Engineering and Computer Science, as well as the University of North Texas Department of Library and Information Sciences, will engage in a two-year research grant to develop a broadly adaptable library cyberinfrastructure strategy for big data sharing and reuse. The strategy is based on intelligently matching and synthesizing five types of existing cyberinfrastructure options against key requirements extracted from three representative library big data services. The strategy will be validated against different experimental deployments of these services.

Digging into the Knowledge Graph (LG-00-17-0103-17), University of Wisconsin System, \$175,000

The Digging into the Knowledge Graph projects brings together researchers from the University of Wisconsin-Milwaukee school of information studies in the U.S. with Canada and the Netherlands. The team will develop and implement standardized vocabularies, workflows and best practices to enhance findability and storage for humanities and social science Linked Open Data datasets. Linked Open Data is a technique for making data available online that enables broad reuse by supporting connections between disparate datasets. The team will pilot the work through case studies in musicology and economics, and enable wider knowledge creation by making the metadata for these Linked Open Data datasets available for data mining. This award supports the U.S. team's participation. International partner organizations are supported through awards made by funders in their respective countries.

Oceanic Exchanges: Tracing Global Information Networks in Historical Newspaper Repositories, 1840-1914 (OcEx) (LG-00-17-0104-17), Northeastern University, \$199,998

The Oceanic Exchanges (OcEx) Project brings together collaborators from Northeastern University in the U.S., Finland, Germany, Mexico, the Netherlands and the United Kingdom. The project will link digital repositories to enable analysis of nineteenth century newspapers across national and linguistic boundaries. Not only will researchers be able to analyze and visualize newspapers within their local and national settings, but they will be able to examine how ideas moved across time and place, beyond and between national borders. The resource will reveal the global networks through which texts and concepts traveled, creating new evidence about how readers around the world perceived one another.

