



CLIR Fellowships In Data Curation Cultivating Resilient Networks of Support for New Scholars

Liz Bishoff
Thomas F. R. Clareson

August 2023



Council on
Library and
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Resources

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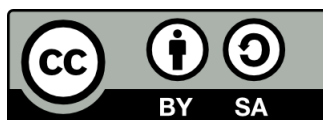
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Foreword

The Council on Library and Information Resources (CLIR) first received support from The Andrew W. Mellon Foundation in 2018 to commission the program evaluation summarized in this report. The evaluation was scheduled to proceed at a leisurely pace, enabling researchers to capture perspectives of participants in CLIR's Postdoctoral Fellowship Program over the course of several years. Having supported postdoctoral fellowships continuously since 2004, the program's leaders have seen that participants' reflections on their own experiences could evolve in meaningful ways. These evolutions in thinking are key intended outcomes for the program. Created as opportunities for recent PhDs to explore career paths beyond postsecondary teaching, the fellowships have always been about the exploration of the unknown.

Embarking upon this project in spring 2019 with Liz Bishoff, of The Bishoff Group, and Tom Clareson, of Lyrasis, leading the way, neither the research team nor CLIR staff could have predicted the ways that the coming pandemic and its consequences would so dramatically affect CLIR, fellows, and their host organizations during the study. Remote work, increasing demands for broad public access to the raw materials and products of research, and the deadly consequences of social and economic inequity brought everything into question. Established ways of supporting fellows became either inadequate or impossible, and fellowship project plans were either unworkable or supplanted by more urgent concerns. For the evaluation, teasing out the subtler effects of the fellows' work on their disciplines and on data and software curation practices from the global forces at play within those fields grew increasingly difficult, while other questions emerged: What does a responsible approach to facilitating short-term employment during an economic crisis look like? How do libraries and other cultural heritage organizations regroup to advance their goals for preserving and creating access to data? How is it possible to keep socially distant from yet emotionally attentive to surrounding communities? How do academic and cultural heritage organizations prepare for a permanently altered, post-COVID world?

It was fortunate that the authors of this report had experience, openness, and curiosity sufficient to guide CLIR colleagues through this time of uncertainty without losing the project's focus on CLIR's fellows and its host partners, and

on the program's longer history. As a result, our organization has gained valuable insights, many of which could be applied to the creation of six new Community Data Fellowships in 2022. Perhaps even more important, the evaluation became an opportunity to capture and describe the evolving thinking of a small group of thoughtful, creative people building projects and launching careers at a historic moment of uncertainty and upheaval.

If CLIR has already reaped many benefits from the authors' study, who else might benefit from reading this report? While the authors' central research questions are targeted to the concerns of one small program and its participants, their findings and recommendations should be valuable to others:

For funders of fellowship, internship, or residency programs, the experiences of CLIR's fellows captured through this study will be helpful in supporting others who wish to design and implement short-term employment programs that aspire to fill skill gaps while helping emerging leaders explore career possibilities. Maintaining the delicate balance between managing operations and expectations in these programs requires careful forethought and ongoing sensitivity. Ensuring that future program leaders have the commitment and capacity to adapt to changing circumstances will improve their chances of serving participants well.

What CLIR's fellows have valued the most about participating in the program has been having the support of a cohort of like-minded peers facing similar challenges while navigating through a time of professional reflection and growth. This kind of support requires leadership, dedicated staffing, and investments in time and resources. Moving forward, continuing to nurture peer networks established through small programs like CLIR's—and forging connections between these and other professional learning communities—could help an even broader range of knowledge workers acquire the skills they need while building important relationships they can rely on throughout their careers.

For leaders of longstanding programs in the academic and cultural heritage sectors, the report provides a look at how one program and its partner organizations have navigated the circumstances of the pandemic, finding new ways to collaborate while reassessing both individual and shared priorities. The approaches that fellows and host organizations have taken to their work together since 2020 can offer useful

models. Some were able to adapt remarkably well to new circumstances, making impacts much more profound than originally anticipated. Given the changing environment that academic, cultural heritage, and other nonprofit organizations face, continuing to plan in ways that facilitate adaptation in times of major disruptions by taking advantage of the insights of colleagues who lived through the pandemic makes good sense. The resilience that CLIR's "COVID era" fellows and supervisors encouraged in one another will make them wise advisers for others in the future.

For people who design short-term project-based positions in academic or cultural heritage organizations, the experiences of CLIR's fellows demonstrate the stark differences between fellowships framed by clear, mission-aligned goals well suited to the skills and interests of individual fellows, and fellowships without such boundaries. For CLIR, turning the program's focus to data and, later, software curation would have been impossible without significant support from the Alfred P. Sloan Foundation and the Mellon Foundation. These funders awarded CLIR a total of 16 grants to develop and manage the data curation fellowship program from 2011 to 2020. The Mellon Foundation's investments helped draw national attention to urgent concerns particular to interdisciplinary fields such as Latin American and Caribbean studies and African American and African studies. More resources will be required to bring curation practices into line with the needs of researchers and interested communities. At the same time, successful projects rely even more on dedicated guidance and mentorship than they do on financial support. The attraction of having the foundations' backing helped CLIR motivate many organizations to advance interesting and creative initiatives. But without investments of significant time and vision from recent fellowship supervisors, none of these initiatives would have made a major impact.

For people embarking upon short-term, project-based work, the experiences captured in this study may be helpful in navigating their new roles, suggesting questions to ask about project design, support, and how to acquire the skills necessary to fulfill goals on schedule. For most of CLIR's recent fellows, projects did not unfold precisely as planned; for some, the day-to-day experience differed dramatically from what the original fellowship position description promised. At the same time, their experiences have shown that it is possible to emerge from a term-limited role with transferable skills and clarified personal aspirations that can lead to satisfying careers.

Finally, for *people interested in raising awareness about the importance of digital scholarship and curation within the academy, cultural heritage, government, and beyond*, CLIR's community of 221 current and former fellows and their colleagues at the program's 93 unique partner organizations includes many who sincerely care about helping people to understand how our changing information environment is affecting the preservation of, access to, and the quality of human knowledge. As new challenges continue to emerge, it becomes increasingly important for every citizen to have an appreciation of how knowledge is created, captured, manipulated, and shared. Continuing to tell the stories of how such work happens is vital to the future of our planet.

---Christa Williford, Senior Director of Research and Assessment, CLIR

Executive Summary

Established in 2004, the CLIR Postdoctoral Fellowship Program (program) had as its goal the recruitment, training, and creation of cohorts of new PhDs working within the library or cultural heritage digital environment to help manage, sustain, and generate valuable information in support of research and learning. With the data curation fellowships, introduced in 2012, the goal was for the fellows to “contribute to a more sophisticated understanding of data curation and its often-determining role in the conduct of scientific and social science research” (Bishop and Williford 2019, 1).

This report:

- discusses the methodology of the 2018-2022 assessment of the CLIR program;
- provides an analytical review of prior program assessments;
- identifies the types of data curated through the fellowships;
- identifies differences in data curation across the different cohorts;
- explores the challenges emerging from those curation activities;
- identifies the impact of the fellows’ work on their host organizations and communities;
- assesses the impacts of the COVID-19 pandemic and contemporaneous social movement events on the fellows; and
- identifies future priorities for the program.

Following on several prior programmatic assessments, CLIR contracted with Liz Bishoff, of The Bishoff Group, and Tom Clareson, of Lyrasis, to evaluate the program from 2019 to 2022.

Key Findings

Data curation activities: Across all data curation fellowships, regardless of year, funder, or topic, fellows undertook a range of data curation activities, both technical (e.g., data migration, data visualization, digital preservation, collection digitization, and metadata creation and enhancement) and related activities such as needs

assessment, consulting, teaching, promotion of data collections, and collaborative campus and community outreach.

Fellowship program goals: The program has largely achieved the goal of expanding the capacity of libraries and developing a cohort of individuals with both subject matter expertise and data curation skills, recognizing that over the period, library capacity to support data curation has matured. As one interviewee noted,

The fellowship program has changed over the years because academic departments and libraries have changed over the years. The areas that the fellows worked in have become honed over time, because libraries are doing great digital humanities and data work. The infrastructure and best practices are coming from libraries. This was rare in the early days (Bishoff and Clareson, *Postdoctoral Fellowship Program Leadership Report*, 2020, 4).

Shifts in these activities suggest that the maturing of library-based data curation programs has allowed fellows to refocus their work from needs assessment and planning to project implementation, consulting, instruction, and outreach on campus, within their disciplines, and to communities outside the library or campus with an interest in using digital resources.

What is data curation? Throughout the different data gathering activities for this study, two or three fellows who were interviewed reported that the answer to “What is data curation?” is still elusive for both the fellows and the host organizations. Some fellows reported that this lack of clarity directly affected their work. When interviewed, fellows reported disappointment when what they worked on for their first year was not what the host organization, particularly library administration, wanted or needed. Others were disappointed when their completed projects soon lay dormant.

Planning improvements: Throughout the fellow and the host organization supervisor surveys and focus groups, challenges with goals development and overall planning for both the fellowship and the fellow’s independent research projects were often mentioned. The importance of investments in planning by the host

organization before the fellow arrives, as well as in initial meetings with the fellow, is one of the most important takeaways from the evaluators' research.

There were several areas in which host supervisors and fellows identified potential improvements. These included negotiation of the individual fellows' research goals and the scope of their project or projects, ensuring that the host organization understood the meaning and purpose of the fellowship program, and making sure key stakeholders, including the fellow's colleagues both within the area of work, as well as departments the fellow worked with, understood the program.

Diversity and Social Justice: CLIR has made significant strides in diversifying the composition of the program's fellows by offering fellowship cohorts in Latin American and Caribbean studies and African American and African studies. These cohorts diversified the makeup of the fellows while providing an environment for them and their host organizations to address issues related to contemporary social justice movements. Fellows explored how data curation activities needed to reflect the needs of researchers, the content holding organizations, and unique elements of the collections.

The evaluators were able to talk with the African American and African studies fellows and supervisors about the impact of the contemporary social justice movements. Supervisors noted that changes were being made to address social justice issues, such as holding training sessions for staff, offering programs for the public, and developing metadata guidelines that encourage respect and inclusivity. One fellow noted "that surface changes were made, but understanding the deeper issues still needs attention."

Impact of the program on fellows' future success: Nearly all the fellows surveyed indicated that the fellowship made a positive difference in their careers. Their own words capture some of the most important impacts:

- "My CLIR network is almost as important to me as my PhD program cohort/colleagues."
- "I am grateful for the experience and opportunity to focus solely on research for two years."

- “The CLIR postdoctoral fellowship program was an absolute pivotal moment in my career trajectory. It expanded my skills (both technical and ‘soft’ skills), expanded my understanding of myself as a professional, allowed me to gain a much wider variety of professional experiences, and changed the course of my career in truly wonderful and unexpected ways. I am truly grateful for my experience, and I regularly advise current graduate students to seek out similar postdoc opportunities.”

Fellows as contingent workers and fellows’ career development: Most fellows are considered “contingent,” or term-limited, workers in libraries, archives, and museums. Several issues arise from being contingent workers, including but not limited to distinguishing the fellows’ responsibilities from those of permanent staff; the role of the fellow as a “change agent” within their organization; and post-fellowship employment opportunities.

One of the goals of the program was to develop fellows for future library careers. Career development was a focus of both fellows and supervisors, with divergent opinions on the role of the host organization in assisting in the development of each fellow’s career. Common themes from fellows’ responses included:

- a lack of clarity regarding post-fellowship employment opportunities;
- an inability to pursue their own research agenda as part of their fellowship activities; and
- sufficient time to interact with other research scholars where the postdoctoral fellowship was focused on a library specific project.

Closely related to the issue of career development is the host organization’s approach to staffing for its data curation programs. Several fellows reported that their host organization was using grants to support ongoing staffing for the data curation program, rather than making a commitment to hiring permanent staff for the program.

Networking: Almost universally, the fellows identified their fellowship cohorts as having the greatest impact on their development, and as one of the key successes of the CLIR program. Over the years, CLIR has developed a range of activities that focus on providing opportunities for fellows to collaborate, including collaborative

writing and “microgrants.” Alumni fellows and supervisors are invited to participate in CLIR and Digital Library Federation (DLF) committees, review panels, and conference presentations, and these further enhance current and former fellows’ networking opportunities while expanding individual participants’ resumé.

Priorities for the future direction of the program: There were a wide variety of recommendations from both fellows and supervisors for the direction of the fellowship program; many were administrative in nature, and others were programmatic.

Recommendations

Following the key findings above, the consultants recommend the following to address concerns and improve the fellowship experience for both fellows and host organization supervisors.

Fellowship program goals: In recognition of the changes in the library and academic environment, the research team recommends that CLIR host one or more public convenings or conversations that would focus on envisioning the Postdoctoral Fellowship Program for 2025-2030. These conversations should include participation by a full range of stakeholders, including past fellows, past supervisors, library administrators, funders, and representatives of potential community partners with an interest in digitally based research.

Diversity: CLIR, host organizations, and funders should continue to look for opportunities to diversify the field of data and software curation. Members of the African American and African studies cohorts recommended continued work with Historically Black Colleges and Universities. To expand the number of fellows of color, work should focus on local communities, in addition to collections documenting communities of color.

Planning improvements: The CLIR Postdoctoral Fellowship Program staff and leadership, past and current host organizations, and alumni should articulate strategies for improving planning activities before and during the early months of the fellowship. Past fellows and supervisors have ideas for how to improve planning and should be included in the discussions. Working with host representatives and

alumni fellows, CLIR should provide support that helps the host orient a range of stakeholder colleagues to the program prior to the fellow's arrival.

During the initial months of each fellowship, it is recommended that the host institution, fellows, and CLIR focus on goal-setting and project planning. Part of this initial planning can help to address fellows' concerns about the host organization staff's understanding the role of the fellow, the fellow's responsibilities, career options for the fellow, and the nature of the CLIR fellowship program.

What is data curation? CLIR staff provide a definition of data curation¹ in the framing of the program. However, work is needed at both the program level and the host organization level to clarify how this definition maps to fellowship position descriptions and project designs. The lack of a clear understanding may be due in part to the ongoing development of the field as well as host organizations' development of their data curation programs and services. Increasing transparency related to the stage of development of the host organization's data curation program and the purpose and goals of the individual fellowship can improve the understanding of what data curation is for the specific environment.

For organizations that are at an early stage of data curation program development, the consultants have seen that a lack of clarity can provide the fellow with the opportunity to take a leadership role in both vision and goal development, as well specific project implementation. At the same time, several fellows expressed frustration with the host institution's expectation that a fellow could lead the development of a data curation program despite having little to no experience with data curation.

Starting with the definition of data curation that CLIR has provided, CLIR should explore with both the host organizations and the fellows a more nuanced definition

¹ In the 2018 proposal to the Mellon Foundation that created the Fellowships in Data Curation for African American and African Studies, CLIR's team provides this definition: "*Data curation* addresses the challenge of maintaining digital information produced in the course of research. Its purpose is to preserve the meaning and meaningful structuring of that information so that it may be used as input for further research. Curation encompasses gathering material, making it discoverable by describing and organizing it, placing it in a context of related information, supporting its use for diverse intellectual purposes, and ensuring its long-term survival."

that describes the different stages of development in an organization's data curation program. The approach should also consider the state of data curation across different disciplines. The National Digital Stewardship Alliance has developed the *Levels of Digital Preservation* matrix, which provides a useful model for such a document (NDSA 2019).

Fellows as contingent workers and career development: Because contingent workers are common in higher education and cultural heritage organizations, CLIR and its partners must work with others to address the issues.

The issue of post-fellowship employment, however, still requires attention to specific circumstances at each host organization. Supervisors need to make it clear at the recruitment and interviewing stage whether there is a possible post-fellowship position.

Networking: A common theme expressed by both fellows and supervisors was that CLIR should continue the development of networking and collaborative activities, expanding both online and in-person cohort activities for fellows and supervisors. Professional development and continuing education activities should be expanded to include both current and "alumni" fellows and host supervisors. Fellows also supported the continuation of collaborative activities such as the CLIR collaborative writing projects.

Introduction

Established in 2004, the CLIR Postdoctoral Fellowship Program was designed to support the recruitment and creation of cohorts of new PhDs working within the library and cultural heritage digital environment to help manage, sustain, and generate valuable information in support of research and learning. With the introduction of the data curation fellowships in 2012, the goal was for these fellows to “contribute to a more sophisticated understanding of data curation and its often-determining role in the conduct of scientific and social science research” (Bishop and Williford 2019, 1). CLIR aspired to cultivate new ways of thinking about divisions of labor and expertise across the academic professions while bringing focused attention to the development of data curation resources and services that would be responsive to the needs of current researchers (Bishop and Williford 2019, 2).

The goal was for these fellows to “contribute to a more sophisticated understanding of data curation and its often-determining role in the conduct of scientific and social science research.”

Support from the Alfred P. Sloan Foundation allowed CLIR and host organizations to create fellowships in data and software curation for the sciences and social sciences. Following that example, the Mellon Foundation helped CLIR to create similar fellowships in the humanities. From 2013 to 2016, Mellon support helped CLIR offer data curation fellowships in medieval studies, early modern studies, and visual studies. Beginning in 2016, Mellon funded cohorts of data curation fellows in Latin American and Caribbean studies and in African American and African studies. A total of 22 fellows, in four cohorts, participated in those later fellowships. CLIR planned a long-term external assessment of the data curation fellowships that overlapped with the later cohorts, from 2019 to 2022. This study was centered on the following questions:

- What kinds of data have been curated through the CLIR/DLF Postdoctoral Fellowships in Data Curation for the Humanities?
- What kinds of challenges have emerged as a result of that curation?
- What did the fellows, host institutions, and CLIR learn about data curation in the related disciplines of focus (medieval studies, early modern studies, visual studies, Latin American and Caribbean studies, and African American

and African studies), and what similarities and differences are there among the approaches to data curation required for advancing research in these disciplines?

- What have been the impacts of the fellows' work in data curation on their careers, the host institutions, and the relevant scholarly and professional communities?
- How might the program be improved, based upon the experience and feedback of participants?

In addition to addressing these questions, the assessors surveyed current and former fellows and supervisors who participated in CLIR data curation fellowships from 2012 to 2019 to get a sense of the fellowship experience over time and to note any differences between the experiences of those in the humanities and those in the sciences or social sciences. Working with CLIR staff, the assessment team explored questions related to the overall program's educational offerings, networking opportunities, and communication, as well as collecting recommendations for future fellowships. For the fellowships active during COVID-19 and high-profile contemporary social justice movements (such as the national protests against police violence against people of color after the May 25, 2020, murder of George Floyd, as well as other movements highlighting racial disparities in access to health care, housing, employment, and information within libraries), the assessors also collected data related to the impact of COVID-19 and the movements on the fellows and their supervisors.

Methodology

The assessment methodology includes an examination of past CLIR publications and reports related to the fellowship program; interviews with fellows and host supervisors from organizations involved in the fellowships in data curation for medieval studies, Latin American and Caribbean studies, and African-American and African studies (Appendix A and Appendix B); interviews with fellowship program leaders (Appendix C); surveys of current and former data and software curation fellows and host supervisors (Appendix D and Appendix E); and focus groups of fellows and host supervisors (Appendix F and Appendix G).

The fellows' survey was designed to collect information about their experience, post-fellowship experience, and their views on the most significant aspects of the program. The survey was in the field from late February through April 14, 2021. A link to the surveys was sent to fellows and supervisors from the 2012-2019 cohorts, with a cover message from CLIR. The survey was sent to 80 fellows, and 48 responded, for a response rate of 60 percent. An internal report of survey results was prepared, featuring trends and analysis over time and across the different types of data and software curation fellowships offered through the program (humanities data curation fellowships funded by the Mellon Foundation and science and social science data and software curation fellowships funded by the Alfred P. Sloan Foundation).

The host supervisor survey was designed to collect information about the host organization's experience with CLIR fellows, the impact of the data and software curation fellowships on the host organizations, and recommendations for future CLIR Postdoctoral Fellowship Program activities. The supervisor survey was sent to 63 individuals from a list prepared by CLIR program staff and was in the field from late February through April 14, 2021. During that time, CLIR staff e-mailed four reminders of the survey's availability. A total of 19 responses was received, for a 30 percent response rate.

Following the development of the survey report, consultants Bishoff and Claeson conducted focus group sessions based on the findings of the survey and other questions developed with CLIR program staff. CLIR staff extended focus group invitations to current and former fellows and host supervisors, and Claeson and Bishoff met with eight host supervisors and 10 fellows in online focus group sessions. An internal report combining the findings of the focus groups was completed in September 2021.

CLIR Response to Assessment

The assessors submitted reports summarizing the data collected from host organization supervisors in data curation fellowships in medieval studies (five fellowships), fellows and supervisors from the two Latin American and Caribbean studies cohorts (10 fellowships), and fellows and supervisors in the African American and African studies (10 fellowships). These internal reports summarized

findings from interviews with fellows and supervisors from the 2016-2020 cohorts, small focus groups of current and former fellows and supervisors, and surveys circulated to all fellows and supervisors who participated in the data curation fellowships from 2012 to 2019. Each of the reports included key findings and recommendations as well as detailed analysis. This approach allowed CLIR to act on recommendations throughout the project, rather than delaying action until the final report is published in 2023. The CLIR Postdoctoral Fellowship Program website contains a variety of resources to aid both fellows and supervisors. The following are examples of changes that were made in 2019-2020 because of the evaluators' recommendations:

- revisions in host and fellow application forms;
- revisions in the fellow report template to solicit more information about skills development and interests;
- new guides to assist fellows and supervisors;
- the appointment of a mentor to lead a series of online discussion sessions for supervisors;
- the shift to a community data focus; and
- refinements in the program brand and descriptive language to improve the clarity of the goals for the program, CLIR's role in supporting it, and the scope of the individual fellowships.

In early 2022, the CLIR Postdoctoral Fellowship Program announced a new cohort that supports community data fellowships. The proposal for this new cohort was inspired by the work that previous fellows have done in building relationships between host and community organizations to foster collaborations that involve data curation, access, and use. These fellowships are three years in length, rather than two years; include additional support for supervisors; and connect with partner organizations in shaping the scope, goals, and deliverables for each fellowship. A more extended and intensive planning period involving CLIR and host organizations is envisioned in the proposal, allowing host organizations more time to help organizational administrators and human resource department representatives understand the support that fellows require.

Program Background

The Council for Library and Information Resources (CLIR) launched the CLIR Postdoctoral Fellowship Program in 2004, following a 2003 meeting called by then CLIR President Deanna Marcum. The program was conceived as a fellowship that would “bring those who had recently earned a PhD in humanities and who had an interest in library work ... into academic libraries as a means of enhancing dialogue between scholars and the academic libraries they use, exposing the new PhD to career opportunities within the library and engendering a new kind of specialist and potential leaders” (Waraksa 2015, 5).

Scholars are in great need of basic archival skills to help them set priorities for data curation tasks and decide which data should be preserved.

The program anticipated that host organizations would be exposed to the research and technology capabilities of those with recent humanities PhDs. The CLIR postdoctoral fellowships were among the earliest “alternative academic” (alt-ac²) fellowships; “the fellowship in part was conceived as a response to the ever-worsening job market for those with PhD in Humanities” (Waraksa 2015, 5). The program was created to address the “needs of both the emerging scholar and the institution facing radical changes in the information landscape” (Waraksa 2015, 5). For many host organizations—most of them academic libraries—establishing or enhancing scholarly communication programs was an early focus for fellows’ work.

Over the past 17 years, CLIR, program funders, and host partners expanded the program, broadening the range of disciplines from the humanities and arts to the sciences and social sciences, and focusing the issues on emerging areas of work in academic libraries. In 2012, through a project supported by the Alfred P. Sloan Foundation, former fellows Lori Jahnke and Andrew Asher issued a report, *The Problem of Data: Data Management and Curation Practices among University Researchers* (Jahnke and Asher 2012). The report was based on interviews

² “Alt-ac” was first defined in 2010 by Bethany Nowvickie and Jason Rhody as short-hand for alternative academic careers. In a 2013 article in *Inside Higher Education*, they defined alt-ac as an umbrella term to refer to full-time non-teaching and non-research positions within higher education. These can be staff or administrative positions, and these positions may (and often do) include teaching and/or research duties, but teaching and research are not the primary focus of the positions. There are also comparable alt-ac positions beyond campus; people pursuing alt-ac careers include public historians, librarians, museum curators, independent scholars, professional writers, etc. <https://www.insidehighered.com/advice/2013/05/22/essay-defining-alt-ac-new-phd-job-searches>

with researchers from five institutions of higher education. Its purpose was to gather a more complete and researcher-centered understanding of the data usage, management, and preservation practices of university-level faculty, postdoctoral researchers, and staff researchers. The authors indicated that their goals were to identify barriers to data curation within the university environment (Jahnke and Asher 2012, 5).

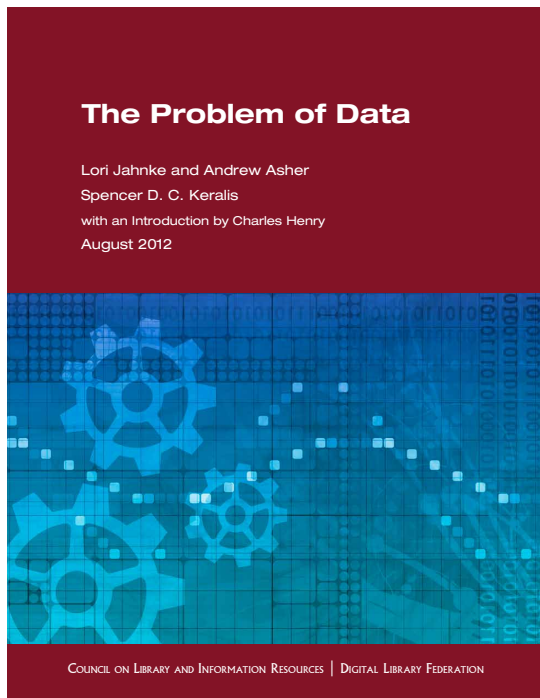


Fig. 1: In 2012, CLIR published *The Problem of Data*, presenting the research that informed the creation of the first CLIR fellowships in data curation. Lori M. Jahnke and Andrew Asher contributed "The Problem of Data: Data Management and Curation Practices Among University Researchers," and Spencer D. C. Keralis contributed "Data Curation Education: A Snapshot."

The report set a definition of data curation, identified barriers to data curation, recognized the unmet needs of researchers, and promoted a holistic understanding of workflows involved in the creation, management, and preservation of research data. Recommendations were designed to inform data curation programs whether based in the university library, campus information technology, or an academic department. In 2012, researchers were largely on their own when managing data. The authors noted that "few researchers ... thought about long-term preservation of their data. Perspectives regarding research data tend to be pragmatic" (Jahnke and Asher 2012, 5). These same researchers were skeptical of the long-term interest in their data and often doubtful that future researchers would be interested in their primary materials. Jahnke and Asher concluded that "scholars are in great need of basic archival skills to help them set priorities for data curation tasks and decide which data should be preserved" (Jahnke and Asher 2012, 5).

Charles Henry, CLIR president, in the introduction to the report, noted that "there are currently no effective ways to prepare people for hybrid roles associated with curation—knowledge of the specific domain and lack of standards adopted by places that support curation—libraries, data centers and academic departments (Jahnke and Asher 2012, 2). Based on their research, Jahnke and Asher concluded that there is "an urgent need for a reliable and increasingly sophisticated professional cohort to support data-intensive research in our colleges, universities and research centers" (Jahnke and Asher 2012, 2).

In 2012, with the support of the Sloan Foundation, CLIR established its first fellowships in data curation. The Fellows in Data Curation for the Sciences and Social Sciences cohort was established to help create best practices and encourage sharing methods across data centers (Jahnke and Asher 2012, 2). The establishment of these fellowships responded to the needs identified in *The Problem of Data* and tested Jahnke's and Asher's specific recommendations in support of research data curation in general.

In 2013, the Mellon Foundation began funding data curation fellowships in the humanities, including Data Curation for Medieval Studies (2013), Data Curation in Early Modern Studies (2014), and Data Curation for Visual Studies (2015). Mellon continued its support of the data curation fellowships for humanities scholars with funding for 10 fellowships in Latin American and Caribbean studies beginning in 2016, and 10 in African American and African studies beginning in 2019. For the period 2012-2022, there were 91 data curation fellowships at 61 organizations across the humanities, social sciences, and sciences (Christa Williford interview, 2022).

While curating, managing, and using digital collections were always components of the fellowship program, the importance of investment in those areas, regardless of discipline, was further heightened as the world was thrust into a global pandemic and subsequent movements highlighting economic and social inequality. Those circumstances forced the academy, governmental entities, the private sector, and libraries to reconceptualize how they would meet their missions and goals, as well as who they are including within the communities they serve. The CLIR fellows and their host organizations had to respond to the rapid changes brought on by the spread of COVID-19 while still meeting program and project goals. For the humanities fellowships focused on data curation in Latin American and Caribbean studies and in African American and African studies, data curation practices for broadening representation in the digital research environment and for supporting and advancing social justice were major concerns.

The Impact of the CLIR Fellowship on my Approach to My Career

Hadassah St. Hubert



CLIR Postdoctoral Fellow in Data Curation for Latin American and Caribbean Studies, Digital Library of the Caribbean
Florida International University
(2018-2020)

Senior Program Officer, Division of Preservation and Access
National Endowment for the Humanities
(2020-present)

My CLIR postdoctoral fellowship was transformational in my career. CLIR staff were particularly important in this process as they often provided their time, aid, and advice during the fellowship. I'm truly indebted for all their help in reading/editing many cover letters and CVs. I learned from the experiences of CLIR staff and their colleagues during the fellowship about career paths in and adjacent to academia. As I learned about various career trajectories, I was able to home in and develop skill sets essential to my current career at a humanities funder. My cohort continues to be another main source of support, and they are an essential part of my network. We have been able to work with each other even after the fellowship ended. Despite moments of transition within my past institution, CLIR staff and fellows were a stabilizing force during the fellowship. Some critical takeaways from the fellowship included grant writing and administration, developing community partnerships, and methods of navigating institutional bureaucracies.

The Impact of the CLIR Fellowship on my Approach to My Career

Kevin C. Winstead, Ph.D.



CLIR Postdoctoral Fellow in Data Curation for African American and African Studies, Center for Black Digital Research Pennsylvania State University (2019-2022)

Postdoctoral Research Fellow, School of Literature, Media, and Communication Georgia Institute of Technology (2022-2023)

The CLIR/DLF Fellowship in Data Curation for African American and African Studies has had a significant impact on legitimizing my role in the burgeoning fields of Critical Data and Black Digital Studies. The weight of the Council of Library and Information Resources, the Digital Library Federation, the collection of various funded projects, and the Mellon Foundation contributed to communicating to multiple disciplines that African American Studies can play a vital role in conversations about ethics and culture in the use of digital tools and digital social platforms, and in information studies. The digital humanities operate best in community. The opportunity to participate in a research project with multiple employees, community partners, and institutional homes, in addition to the CLIR-provided cohort, mentors, and administrators, modeled for me how I can be productive in my career while being generative for others as well. The care and financial support of the institutional partners and CLIR during COVID meant that scholars in a precarious position, like myself, were kept from

being neglected or unemployed during the most uncertain time of our professional lives. CLIR not only made space for my work but also kept us whole and healthy during a crisis. I will forever be indebted to the Center for Black Digital Research, CLIR, DLF, and Mellon for an extraordinary opportunity and the unbounded levels of care.

Prior assessments of the program

Assessment activities have occurred throughout the duration of the CLIR Postdoctoral Fellowship Program. CLIR has established robust methods for gathering input from host organizations, fellows, and alumni, guests involved in the education components of the program (e.g., the initial orientation seminar and regular online meetings and discussion sessions held throughout the fellowship period), funders, and the larger academic and library communities. An advisory committee made up of past fellows, digital scholarship specialists, data curation educators, and scholars has played a key role in ongoing assessment, in both reviewing assessments and overall program and policy review. The current assessment, funded by the Mellon Foundation, has been informed by the work of Lori Jahnke and Andrew Asher, Elizabeth Waraksa, Alice Bishop and Christa Williford, Marta Brunner, and others, allowing this current assessment to evaluate the impact of previous recommendations and to identify barriers and challenges that remain for participants. Among the key barriers and challenges that persist are the need to plan for the fellowship before the fellow arrives, and to build a culture of goal setting and planning for the host supervisor and fellow that continues throughout the fellowship term.

The 2019 paper by Lori Jahnke and Andrew Asher, *Ongoing Challenges for Data Curation: A Program Assessment of the Early CLIR/DLF Postdoctoral Fellowships in the Sciences and Social Sciences, 2012-2016* (Jahnke and Asher 2019), reported the results of interviews and on-site visits with selected fellows, supervisors, and project team members from fellowships in data curation for the sciences and social sciences active from 2012 to 2016. The authors identified six categories of primary activity undertaken by the fellows during this period.³ These categories were also emphasized in the 2021 fellow and host supervisor surveys, allowing the current assessment effort to identify changes in the activities between the early cohorts of data curation fellows and more recent cohorts. The 2021 surveys also solicited information about more specific data curation activities such as metadata creation and enhancement, metadata harvesting, digital preservation, and data visualization.

³ These include assessment and planning, education and training, software/tools development, infrastructure, collections, and outreach.



Fig. 2: *Postdoctoral Fellowship Program Summer Seminar, Bryn Mawr College, 2019*

In the past, CLIR has responded to the recommendations from those assessments by making changes in the host and fellow application processes, modifying and expanding the educational components of the program, and incorporating the supervisors into the summer orientation seminar. For the current assessment, researchers included in their

survey, interview, and focus group protocols a number of questions to prompt reflections on earlier recommendations for preventing fellow isolation, structuring fellowship projects, involving library and organization administration in both planning and implementation of the fellowships and articulating requirements for a successful fellowship.

Early findings

Fellow activities: Building off the six activities associated with the data curation fellowships (assessment and planning, education and training, software/tools development, infrastructure, collections, and outreach), Jahnke and Asher found that many of the projects they examined fit into the assessment and planning category, “focusing on needs assessment, requirements gathering, and other planning activities” (Jahnke and Asher 2019, 5). The authors concluded that “the abundance of assessment and planning is perhaps another reflection of the very early stage of development around data curation services and infrastructure” (Jahnke and Asher 2019, 5). Fellows also undertook curriculum development, managing working groups, and providing consulting services. Less common in the 2012-2016 data curation fellowships were projects that focused on infrastructure or collection and software development. These early data curation fellows rarely described their work as “outreach,” “but key activities in nearly all projects involved interacting with previously isolated departments, divisions or programs” (Jahnke and Asher 2019, 5).

Jahnke and Asher went on to note that while assessment and planning for research data management services is important work, “it risks not fully utilizing fellows’ disciplinary expertise and duplicating research efforts and outcomes between institutions” (Jahnke and Asher 2019, 8). They went on to note that they expected the assessment responsibilities to diminish in future cohorts as the research data management field matures.

Role of the fellow: Jahnke and Asher recommended that fellows be integrated into research teams, supporting the concept that data curation needs to be considered from the initiation of research rather than as a post-project effort. They found that through 2016, “few fellows worked within disciplinary teams that were actively collecting research data” (Jahnke and Asher 2019, 8), and that most often the fellows were working with existing datasets, curating the data via digitization of physical materials.

Challenges: Since the earliest assessment, in 2009, fellows reported that issues related to navigating host organization structure were among their most significant challenges. These included mediating conflicting goals between fellows and supervisors, lack of support from library and organizational administrators, and insufficient understanding of the fellow’s role among colleagues at the host organization. Echoing the recommendations of prior assessments, Jahnke and Asher stressed that “a successful fellowship requires a foundation of planning and administrative support at the host institution, both from upper-level leadership and within the division or department where the fellow will work” (Jahnke and Asher 2019, 13). A 2009 report, *Ph.D. Holders in the Academic Library: The CLIR Postdoctoral Fellowship Program* (Brunner 2009), found that the fellow did not always fit into the library’s human resources framework. “Size and entrenchment of existing bureaucracy will increase the amount of advanced planning and preparation needed before the fellow arrives” (Brunner 2009, 29).

Contrasting input gathered from former fellows and administrators at former host organizations, Brunner observed, “Even with a lot of advanced planning on the part of the institution, there may still be lingering tensions between the institution’s desire for flexibility and the fellow’s need for direction and support” (Brunner 2009, 21). One library administrator commented, “. . . being less specific about what the

Library wants CLIR fellows to do ‘forces them to learn about the organization, to figure out what we do and how, and then to figure out what to do during their fellowship’” (Brunner 2009, 22). Another administrator shared that “the thinking behind this loose structure was that learning on the job was better than a lot of formal training” (Brunner 2009, 23).

The process of selecting host organizations and fellows follows the Fulbright fellowship model. Applications from potential host sites and fellow candidates are reviewed by CLIR staff and past or current fellows. Once the host is selected, current and former fellows’ reviews of each candidate application are made available to host organizations. The host is responsible for interviewing and selecting the fellow. Once selected by the host, and at the beginning of the fellowship work, goals need to be outlined and agreed to early in the fellow’s tenure; these goals need to be explicitly stated and realistically attainable. Failure to establish goals, as Jahnke and Asher have noted, will result in “mission creep” and limit the ability of the fellow to meet fellowship goals. In 2009, Brunner recommended that participants reflect on the purpose of the program, “especially the goal to create a new kind of scholarly information professional” (Brunner 2009, 27).

Another issue is where the fellow fits within the library and the larger organizational environment. CLIR recommends that, when possible, the fellow have appointments in both the library and an academic department. These joint appointments allow the fellow to enhance the library’s collaborative effort with the academic department, with the fellow playing a liaison role and facilitating collaboration. For this to be successful, both library and organizational administration need to support and value the benefits of nurturing and sustaining such collaboration. Lack of role clarity has been a source of confusion and resentment, particularly among librarians who work with academic departments. Being short-term workers, fellows have not been treated the same as library faculty and staff by the library or the university. The fellowship program has been seen as a means of facilitating change within the library and academy. But one evaluation noted that the position that the fellow holds within the organization is not conducive to change management. Rather, the success of an individual fellow’s projects, education and training activities, and outreach can influence changes in scholarly communication in areas in which the fellow brings or develops expertise.

Planning for a Successful Fellowship

Mark Christel



Fellowship Supervisor and Samuel R. and Marie-Louise Rosenthal Librarian of the College
Grinnell College
(2020-present)

While I wish I could say our plan for hosting a postdoctoral fellow emerged fully formed from my brain, the truth is more evolutionary and collaborative than mythological. Our project began from the inspiration of a faculty colleague who wished to make an outstanding, but under-recognized, Haitian art collection more visible and accessible. A talented group of librarians, museum professionals, and scholars coalesced around that vision. We leveraged a small grant to complete a successful proof of concept, and then we enthusiastically applied for the CLIR Fellowship to tackle the fuller project.

In retrospect, those early steps all contributed to our evolving plans. The small army of collaborators became a network of invested colleagues whose expertise the new fellow could draw upon. The pilot study established baseline protocols and clarified the boundaries for an achievable project. Engaging with CLIR, which

has been facilitating productive fellowships for so many years, forced us to look holistically at the fellowship as we prepared our application: where would the fellow be positioned within our organization; how would we continue to foster the fellow's own research; how could we help the fellow transition from their doctoral program to a highly collaborative environment?

Once our fellow arrived, we quickly realized that another step in our plan had to be demonstrating flexibility. These remarkable fellows lend their considerable knowledge, passions, and insights to our projects and they often enrich them by modifying approaches, revising timelines, and reconceiving possibilities in unexpected ways we might not otherwise have imagined.

Planning For a Successful Fellowship

Jennifer Grayburn



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Temple University
(2016-2018)

Fellowship Supervisor and Director of
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Assistant Director for Digital and Open
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Princeton University
(2022-present)

A successful fellowship starts with a clear and early vision for the fellowship. What specifically will the fellow do? How will their work fit within the scope of a project or priorities of the institution? What resources and relationships can you establish to ensure the fellow has a support network upon arrival? This clarity allows me to build buy-in for the position, identify objectives and milestones for fellowship work, align priorities with supervisors and project leads, and seek and hire a fellow with the right skill sets before the fellowship even begins.

Clear conception of a fellowship also helps me to onboard the incoming fellow, who will likely be experiencing multiple transitions—professional, geographic, personal—all at the same time. If the objectives for a fellowship and project are still fuzzy to me, I know that they will be especially unclear for an incoming fellow. It can be difficult for fellows to navigate and prioritize all of the information they receive when they arrive, so I develop a roadmap in the form of a 30-60-90 day plan, using Trello, that includes early, easy wins for the fellow and identifies and visualizes priorities, training opportunities, and relationships most important to their success.

By scaffolding in both structured and unstructured time during the first months of the fellowship, I aim to provide a framework that provides context and focus for their fellowship work, while also providing flexibility for the fellow to pursue projects, research, development, and relationships meaningful to them.

Recommendations From Earlier Assessments

Planning and preparation: Brunner's 2009 assessment, undertaken just five years after the initiation of the program, reported that host organizations need to recognize the amount of preparation it takes to capitalize on participation in the program. "Many conversations need to happen throughout host libraries before the fellow arrives, and even before the library posts the position announcement" (Brunner 2009, 33).

Flexibility vs. specificity: Brunner and subsequent reports have noted that greater specificity in projects was preferred by fellows, while host organizations desired to loosely define the project, to attract a wider range of applicants. "In loosely defined positions, fellows must take more initiative, must be willing to live with less structure and must be prepared to communicate with their supervisor about their own needs and project ideas" (Brunner 2009, 3). Several fellows and supervisors recommended that year one of the fellowship should focus on specific project responsibilities, allowing the fellow to gain an understanding of the organization's environment and working culture, build relationships, and, as appropriate, learn new skills. Year two can be used to allow the fellow to explore new avenues, work on different projects, and gather information that will aid them in their career choices. Throughout the two years, the fellow and the supervisor need to ensure time for the fellow to work on independent research.

Role of the fellow: Jahnke and Asher noted in their 2019 report that host organizations and fellows need to look for activities that capitalize on the knowledge and expertise of the fellow. The fellow's goals and activities should address shorter-term needs that other staff cannot cover in their work. For example, the fellow can bring their knowledge to bear in areas of metadata enhancement, community outreach, teaching, and conducting workshops, while other staff can be assigned infrastructure implementation and software development.

Staffing: In their 2012 report, *The Problem of Data*, Jahnke and Asher pointed to the need for data specialists. In their 2019 report, they recommended that the data specialists would have knowledge and expertise in the disciplines in which they are working, as well as knowledge of all aspects of data curation. Specialists would have specific technical training and additional training on discipline-based research

modalities and the type of data generated. Jahnke and Asher noted that the best-case scenario is that the “data specialist would be fully integrated into the research team” (Jahnke and Asher 2012).

Interviews with Program Leadership

One additional aspect of Bishoff and Claerson’s overall project methodology was a series of interviews with past and current CLIR staff and administrators who helped to start or develop the fellowship program.

In fall 2020, Bishoff and Claerson interviewed CLIR Postdoctoral Fellowship Program staff and contractors hired to lead the program’s educational activities. Five individuals were interviewed using a discussion guide that focused on the program’s goals and success in meeting them, environmental changes that impacted the host organizations and the fellows, changes in the program since its inception, and potential future directions for the program. Key recommendations derived from these interviews mirror many of those found in other assessment data.

- **Strategic and tactical planning:** The coming period should include strategic planning with a review of the program’s mission, vision, and strategic goal development. Engage key stakeholders in development of the strategic goals, mission, and vision. A period of 12 to 18 months should be used for program review, working with current and future host organizations toward the integration of the cohorts and development of the fellow alumni program.
- **Program development:** Libraries and cultural heritage organizations continue to need educational and professional development opportunities as they tackle emerging cultural issues relevant to their missions, such as promoting social justice. CLIR should explore opportunities to develop a new learning program bringing in alumni fellows, capitalizing on the knowledge they’ve gained through their fellowships as well as their breadth of disciplinary expertise.
- **Environmental changes:** Continue regular program review and modification based on environmental changes both at national and organizational levels.

- Extend the fellowship cycle: The participants recommended moving to a three- or four-year program cycle instead of the two-year fellowship.

Research Questions and Discussion

The 2018 grant proposal that created the current study identified five questions to be addressed as part of the assessment [See **Introduction**, above]. Below are discussions of these questions based upon the analysis of data gathered during the assessment. In addition to responses to these five questions, the research team identified additional issues that arose during the assessment, including the impact of COVID-19 and contemporary social justice issues on the fellows and host organizations.

The 2012-2019 supervisor survey asked respondents to choose from the options that describe the host institution's goals for having a CLIR Postdoctoral Fellow in Data or Software Curation. The options listed activities that the fellow might undertake. The respondent could select all that applied. This chart shows the goals/purpose, with implementing specific projects being a goal for 75 percent of the respondents, followed by creating and delivering education; developing infrastructure and training; conducting community outreach; and developing infrastructure. The chart includes the activities and the percentage of respondents who selected that activity.

Host Organizations' Goals for Having a Fellow in Data or Software Curation

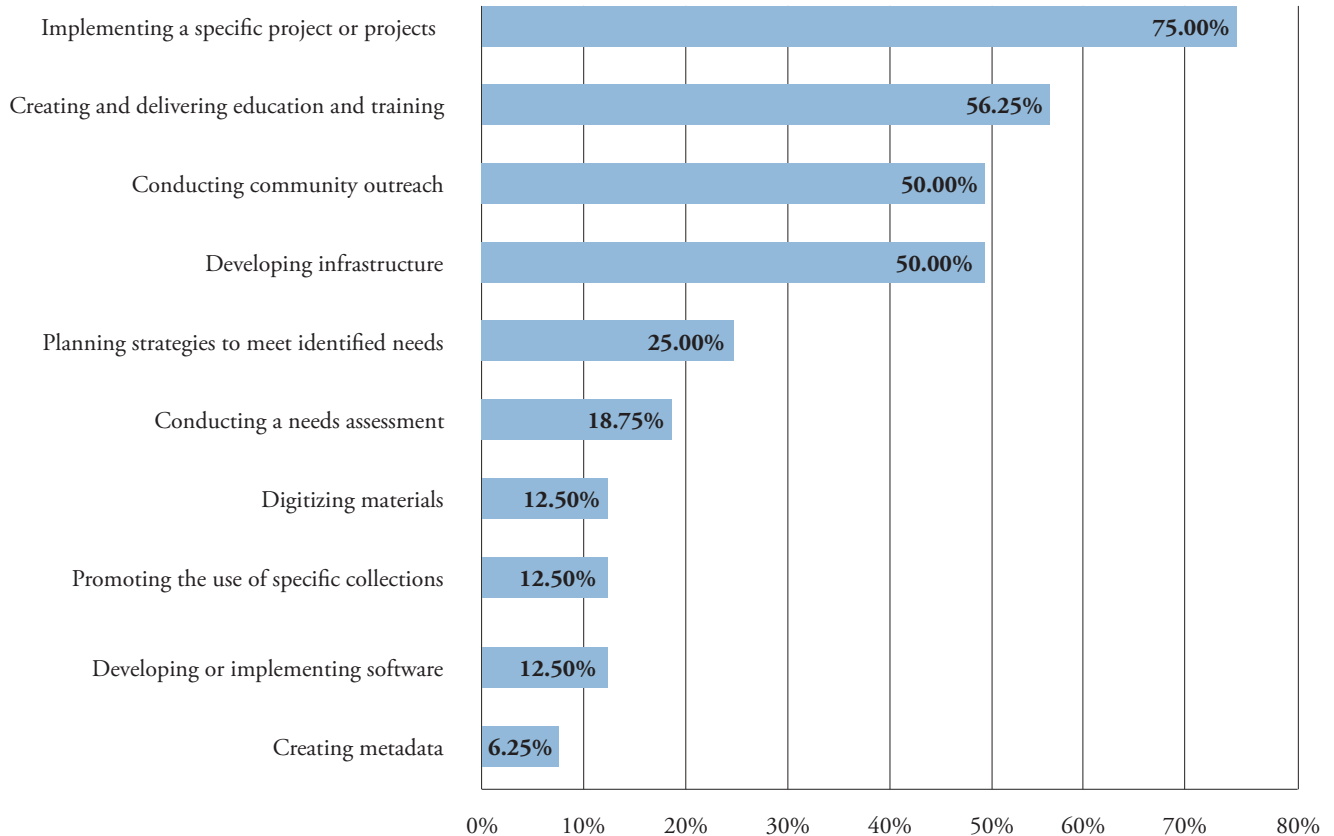


Fig. 3: Primary curation activities undertaken by 2012-2019 fellowship cohorts, as reported in a 2021 survey of current and former supervisors.

The supervisors' survey asked what they considered the critical successes of the fellowship. When comparing those successes with the organizational goals (chart above), the survey found that they sometimes closely paralleled each other. For example, success in raising awareness of the importance of data management correlates closely with the goal of creating/delivering education/training, including one-on-one consultation. Similarly, building new collaborative partnerships and creating/expanding the institution's/department's community outreach program correlated closely.

Critical Successes of the Data and Software Curation Fellowships, According to Supervisors

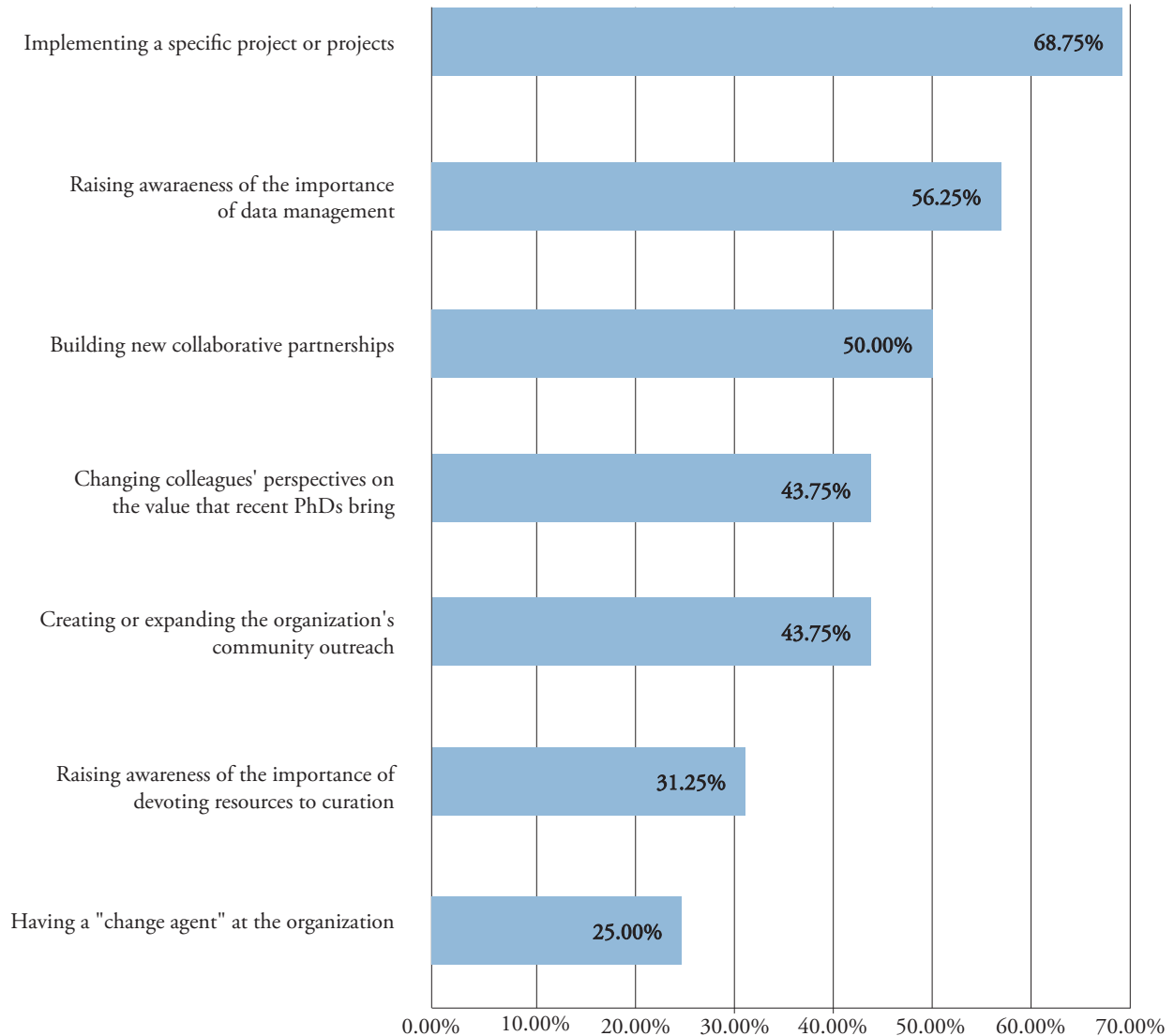


Fig. 4: Critical successes of the data and software curation fellowships, 2012-2019, as reported in a 2021 survey of current and former supervisors.

What Kinds of Data Curation Have Been Undertaken?

Bishoff and Claerson developed a brief survey that fellows completed prior to their interviews. Fellows in the Latin American and Caribbean studies and in African American and African studies were asked what kinds of data they curated, what data curation activities were undertaken, and the source of the data. This survey found that a wide range of data was curated; however, each fellow worked with a

limited number of data types. Library collection or item-level data, such as finding aids, catalog records, or other metadata that support search and discovery (71.43 percent); books, manuscripts, and other textual materials (42.86 percent); and photos, including negatives that were digitized (also 42.86 percent), were the most frequent sources of data curated by the fellows.

The data was derived from a broad range of sources, including host organization legacy digital projects, partner collections, and personal collections the fellows developed prior to their fellowship. Half (50 percent) of the collections that were curated included part of the fellow's personal collection, while 67 percent were legacy organizational collections.

For the purposes of this project, data curation work has been divided into two broad categories, data curation technical activities and data-related activities. The assessment utilized the list of technical activities originally developed in 2012 by Lori Jahnke and Andrew Asher. This list includes metadata creation and enhancement, metadata harvesting, digital preservation, and data visualization. Additional data-related activities include data management consultation, policy development, creating and teaching courses or workshops related to data management, and promotion and outreach activities designed to encourage data reuse. According to the 2021 survey of current and former fellows, regardless of year, funder, or topic, data curation fellows undertook a wide range of data curation activities, both technical and nontechnical data-related activities.

The fellows' survey asked respondents to indicate all activities that they had significant responsibility for during their fellowship. When compared with a similar question asked of supervisors, activities such as implementing projects, conducting community outreach, and creating and delivering education/training were the most significant responsibilities. Survey respondents could select all responses that applied.

Fellows' Most Significant Curation Responsibilities, According to Current and Former Data and Software Curation Fellows

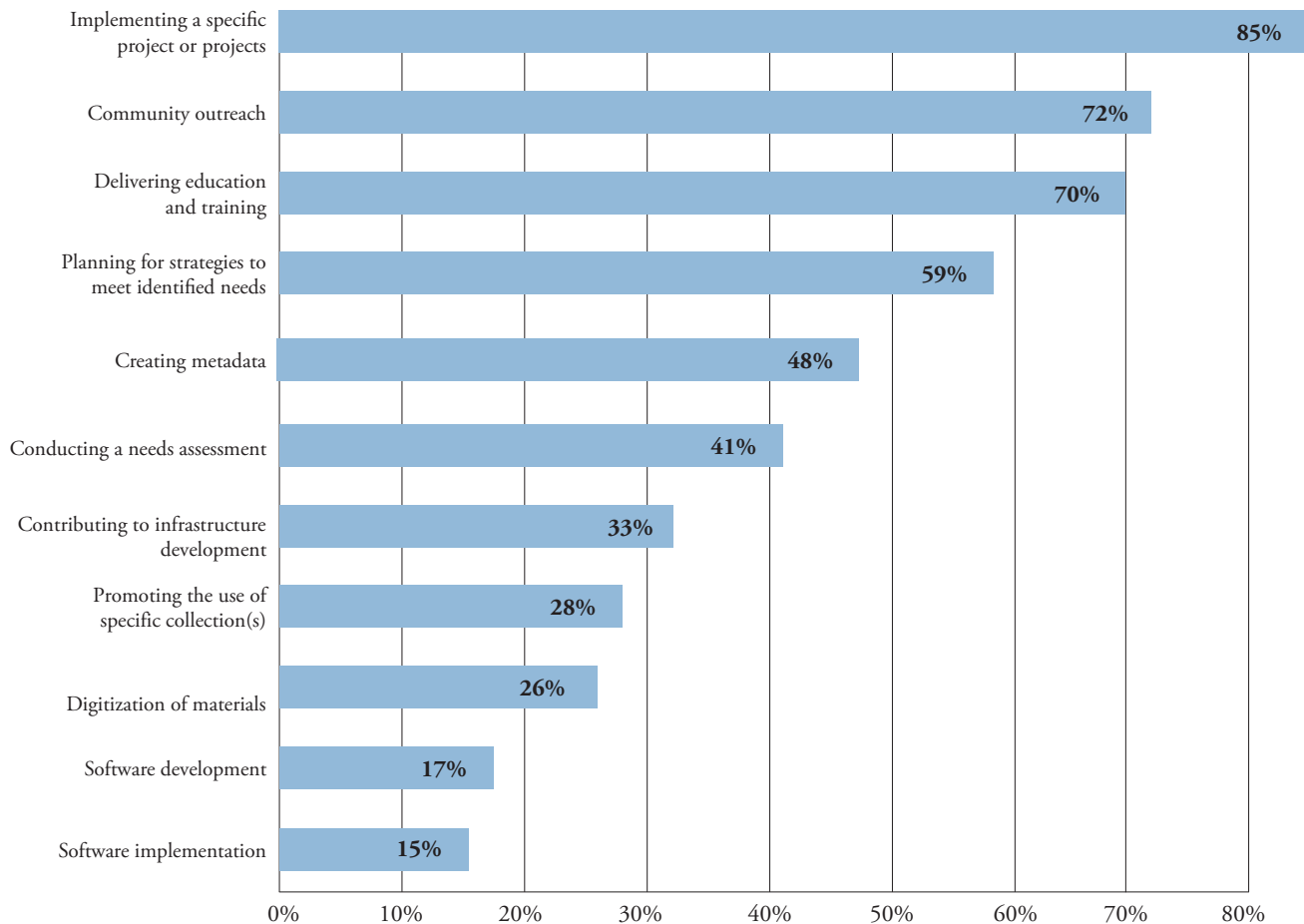


Fig. 5: Data curation activities undertaken by 2012-2019 fellows, as reported in a 2021 survey of current and former fellows.

The specific fellowship projects allowed fellows to utilize their expertise while providing them the opportunity to expand existing or develop new data curation knowledge and skills.

Postcustodial collecting was identified as a new activity to be undertaken as part of the fellowship program.⁴ The Latin American and Caribbean studies cohorts reported participation in postcustodial collecting, with an emphasis on working

⁴ The Society of American Archivists' (SAA) *Dictionary of Archival Terminology* defines postcustodial archiving as "Relating to situations where records creators continue to maintain archival records with archivists providing management oversight even as they may also hold custody of other records." <https://dictionary.archivists.org/entry/postcustodial.html>

with community-based organizations on their own data curation activities, including metadata enhancement, digitization, and making the collections available to both researchers and the population served by the community-based organizations. The cohorts worked with local communities on collection reuse and the development of websites that responded to community-oriented needs and offered consulting services and training opportunities. Working with local communities was part of the fellowship plan. For example, one fellow in Latin American and Caribbean studies reported that working with a nonacademic local community was part of the fellowship plan, while a data curation fellow in an African American and African studies cohort reported that one of the fellowship goals was creating a critical framework and best practices to ensure an ethical, community-based and justice-centered understanding of data curation, data science, and the digital humanities.

Why community engagement and outreach are essential to data curation in cultural heritage organizations

Kristen Regina



Fellowship Supervisor
and Arcadia Director of
the Library and Archives
Philadelphia Museum of Art
(2020-present)

Cultural heritage organizations strive to engage with local communities in their traditional education and outreach activities. But we need to build deeper relationships by engaging digitally and working with historically marginalized communities by meeting them where they are and empowering them to tell their stories on a level playing field with an equally amplified voice. If we don't, we'll continue to move away from holistic, integrated, and truly representative archives and digital collections, perpetuating the narratives created by the establishment and not breaking any past cycles. Data curation is a critical key to unlocking that potential.

Why community engagement and outreach are essential to data curation in academic organizations

Lorena Gauthereau



CLIR Postdoctoral Fellow in Data Curation for Latin American and Caribbean Studies, Recovering the US Hispanic Literary Heritage Project
University of Houston
(2017-2019)

Digital Programs Manager, US Latino Digital Humanities Program
University of Houston
(2019-present)

Community engagement and outreach play an important role in data curation and its impact. These activities have the potential to expand representation through the acquisition of archival collections that include voices that have been historically marginalized from official spaces of “archivization.” Through thoughtful efforts to reach out to the community, organizations can work to develop trust and relationships and create pathways for donations and postcustodial collections. Such outreach efforts can make the archive and data contained therein visible by allowing community members of all ages to see themselves as part of history and knowledge production. Inviting the community to provide feedback and participate in data curation can contribute not only to these relationships but also provide missing information in terms of metadata for archival items and collections (such as names, dates, locations, and context). Feedback on public-facing digital archives and visualizations can assist institutions in creating projects that are more accessible and used by a wider audience. In addition, these efforts can also guide institutions in curating respectful language that more accurately describes the communities represented by their archival items, collections, data, and visualizations.

What Kinds of Challenges Have Emerged?

The challenges faced by fellows can be divided into two areas: those specifically related to data curation, and those that relate to the program's implementation at the local level. As the data curation field has matured with libraries implementing data curation or data research management support, the technical issues—particularly in the larger academic libraries—are less significant than identified in 2012. Based on discussions in the interviews and focus group sessions, technical issues still require addressing within smaller academic libraries, research centers, and academic departments. For example, one fellow working in a research center had as a goal implementing a digital content management system for organizing and disseminating digital collections. Most of the larger research libraries already had well-established content management systems.

Today, library technology-based systems and policies exist to support library-sponsored data curation. As a result, the most recent cohorts, particularly the humanities cohorts, have been able to focus on data-related activities such as consultation, teaching, and community outreach and promotion. Challenges associated with framing and implementing the fellowships by the host organizations still exist. [See the section titled **Early findings** for a summary of implementation challenges.]

Fellows who worked with legacy collections reported a variety of challenges, some of which were exacerbated by the lack of organizational memory related to their projects or staff familiar with their projects. Fellows were tasked with the migration of data and metadata from legacy content management systems to newer platforms used by the host organizations. Legacy digital content management systems presented a variety of problems, including lack of documentation and lack of organizational memory within the fellow's organization to support the data migration. These legacy collections included metadata that followed project-specific metadata practices. Fellows reported that data migration consumed significant project time but was necessary for taking the next steps in their projects. Metadata issues were identified by the fellows, with the most important being the addition of terminology or subject headings appropriate to the collection and to the needs of communities of users. "Library of Congress Subject Headings were just not appropriate for the collection," noted one fellow.

Fellows' Skill Development During Fellowships, According to Fellowship Supervisors

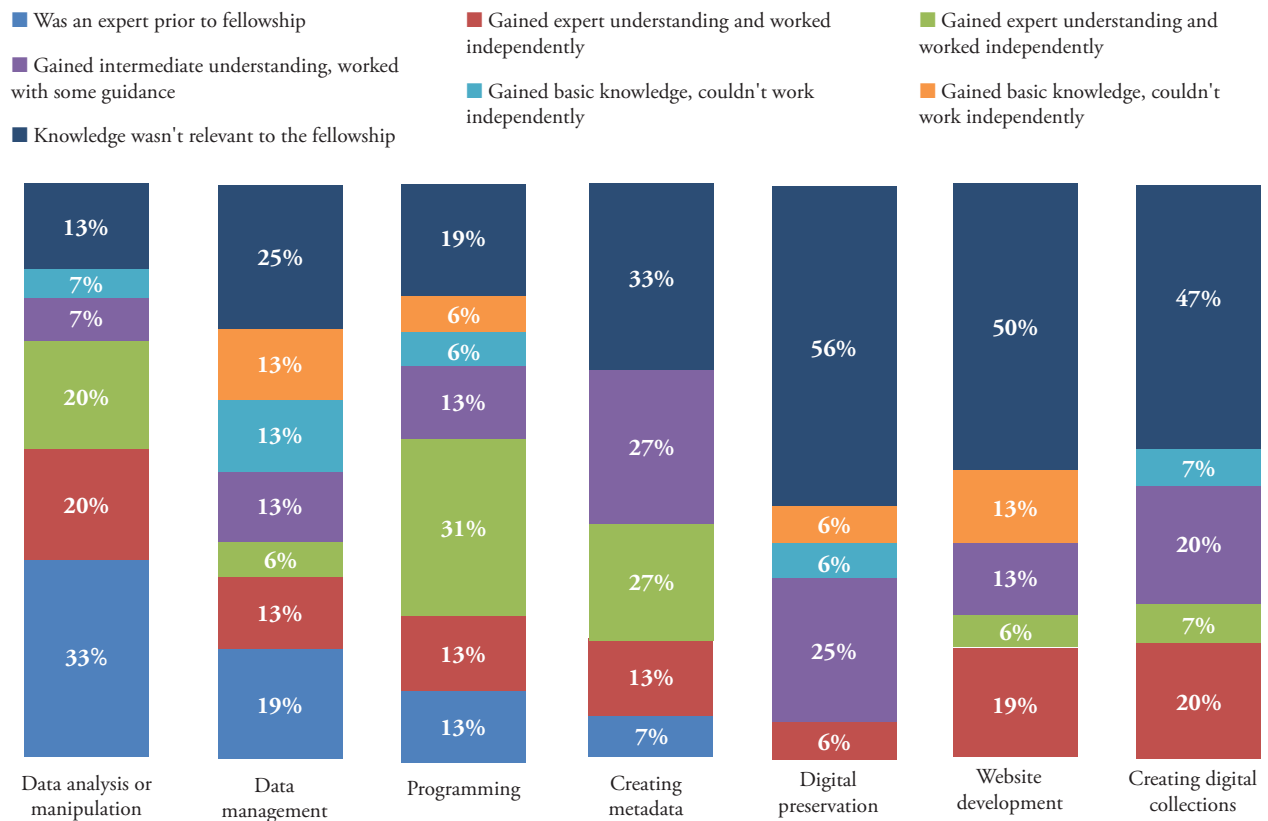


Fig. 6: Fellows' skill development during fellowships, as reported in a 2021 survey of current and former supervisors.

While the fellows brought subject matter expertise and expertise in using digital collections, the CLIR Postdoctoral Fellowship Program is designed to address gaps in their data curation knowledge. The 2021 survey asked host organization supervisors about areas in which their fellows had developed knowledge/expertise through their fellowships. These areas included data analysis, visualization, and manipulation; programming skills including coding or scripting language and version control; metadata creation, and creation of digital collections.

What did participants learn about data curation?

Some fellows pointed out that issues of language and cultural understanding affected curation efforts. As noted above, *Library of Congress Subject Headings*, used most frequently by academic libraries, failed to provide needed access, because of imprecise or inappropriate language, or because of a lack of depth of subject-specific

terminology or understanding of cultural nuances. For some fellows, providing foreign-language subject headings or devising discipline-specific terms was part of the project.

The Latin American and Caribbean studies fellows' projects included work with international partners. Environmental challenges (e.g., hurricanes) and political circumstances often interfered, causing the fellows and their host organizations to modify original plans. In one instance, a fellow's work became particularly urgent because of a changing political situation in the partner country. When fellows' projects involved foreign collections, digitizing these US-held materials and making them openly available was important. However, political and legal issues associated with the owning organization's rights provided unexpected challenges. In some cases, because of political conditions in the materials' country of origin, fellows reported concern for the safety of the individuals who participated in their creation. Frequently, fellows reported being faced with issues of making staffing adjustments in middle of their projects, particularly those in which the international partner was responsible for digitization of the collections, and partner staff members left or were replaced during the project period.

Work with international partners presented several issues. Fellows were faced with developing funding strategies to support the travel of international partners for conferences related to the fellowships. In some instances, the fellows could apply for grants available at the host organization, while others had to apply to other funding agencies. During the COVID-19 period, all travel was suspended, including international travel. Fellows, along with the rest of the academic community, had to move in-person conferences online. As noted in the summary report about *Capacity Assessment of Latin American and Caribbean Partners: A Symposium About Open Access, Technological Needs, and Institutional Sustainability*, fellows' original plans anticipated 30 invited in-person attendees (St. Hubert et. al. 2021). When the symposium was moved online in April 2020, more than 200 individuals from content-holding organizations across the globe were able to participate. The report provides details on the shift of the conference from in-person to online and makes recommendations to content-holding organizations, funders, and future data curators. While there were technology issues associated with the online



Fig. 7: In 2021, CLIR published a report about a 2020 virtual symposium on international digital library partnerships organized by CLIR data curation fellows in Latin American and Caribbean Studies. The report was released in five languages.

program, including ensuring the international participants' ability to support video conferencing and simultaneous translation for non-English speakers, the symposium organizers reported a successful conference.

Two fellows whose work involved international collaboration noted that their experience conducting meetings with international partners through platforms such as Zoom prior to the COVID-19 pandemic proved beneficial, since it was possible for them to rely on this experience when it became necessary to adapt to the conditions of the pandemic in 2020.

What Have Been the Impacts of the Fellows' Work?

In the 2021 fellows' survey, respondents were asked separate questions about the effects of the fellowship on their host organizations, on the fields of data and software curation, and on their academic disciplines or fields of expertise. In each case, the areas where the fellows felt they made the greatest impact was in their work on specific projects, conducting community outreach followed by creating

How Fellows Perceived the Impacts of their Work on Host Organizations

■ A positive impact
 ■ A moderate impact
 ■ No impact
 ■ I don't know
 ■ Not applicable

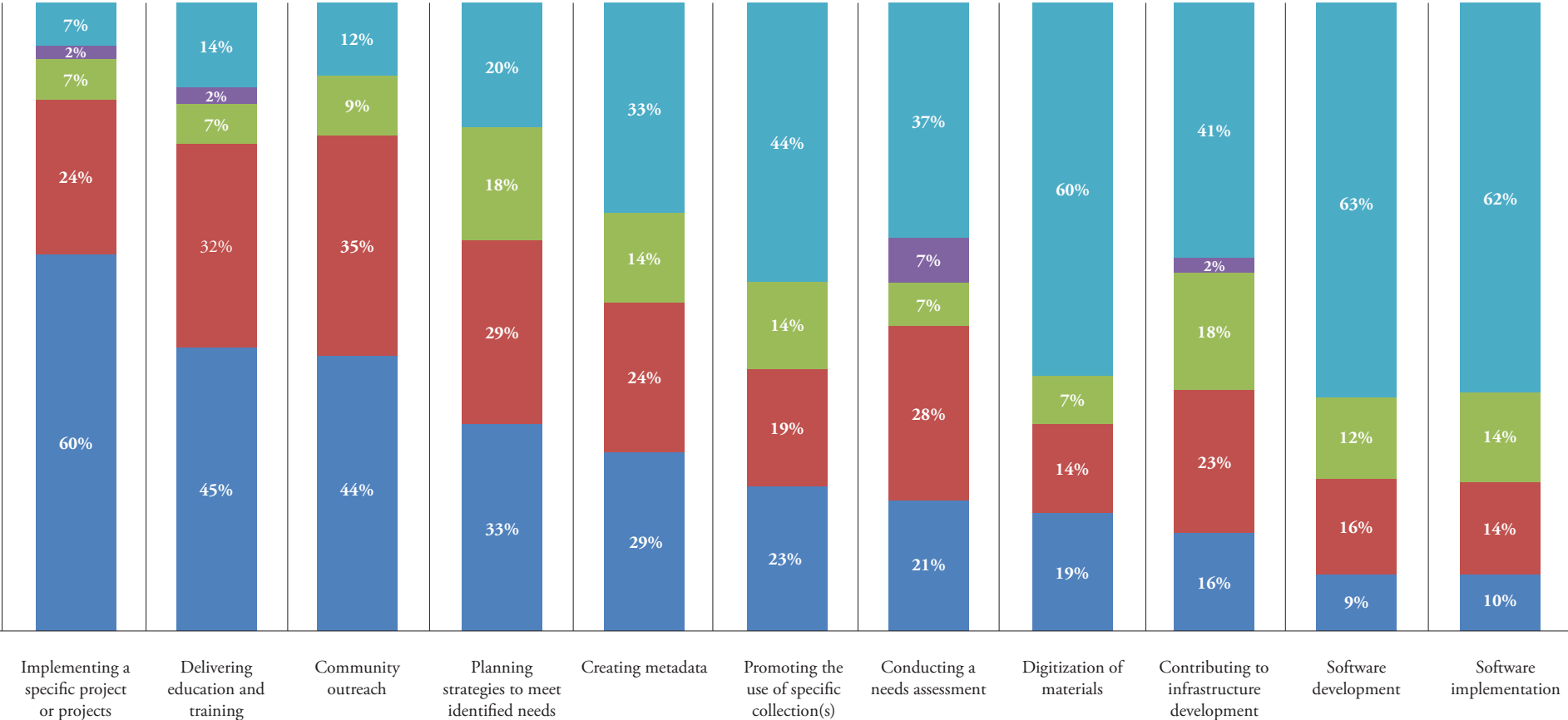


Fig. 8: Fellows' assessments of the impacts of their work on their host organizations, as reported in a 2021 survey of current and former fellows.

and delivering education or training, such as through workshops and one-on-one consultations. The following figure shows level of impact on the host institution.

Fellows indicated that their work had moderate impacts on the field of data curation and on their academic disciplines or fields of expertise. They identified activities that were most significant for the broader fields or disciplines, including conducting community outreach activities like teaching workshops; hosting events; exhibits; doing guest lectures; working with on-campus and community organizations on digitizing collections and/or creating metadata; and planning strategies to meet identified needs.

Another line of questioning in the survey asked respondents to choose the statement that best described the impact of different aspects of the CLIR Postdoctoral Fellowship Program on the fellow's experience. Respondents reacted favorably to many aspects of the program. Those that they perceived were critical to their success or had a positive impact included:

- Interacting with current and former fellows (100%)
- Attending the summer orientation seminar (95%)
- Interacting with CLIR program staff and faculty (91%)
- Attending mid-fellowship meetings, such as at the Coalition for Networked Information (CNI) meetings or DLF Forums (85%)
- Interacting with their fellowship supervisor (75%)
- Participating in collaborative writing (49%)
- Leading or participating in a microgrant project (41%)

Finally, in the fellows' survey, respondents were asked to describe in no more than 10 words what they believe the most significant aspect of their fellowships had been. The research team analyzed the answers from 28 respondents and categorized them into four areas:

- Opportunities and Experience (sample comments: "Bringing domain expertise into academic libraries," "Providing a pathway for PhDs to enter library careers and transform libraries," "Sparking possibilities and creating opportunities for recent PhDs")

- Networking (“Building professional networking skills,” “This community of dynamic people shaped my approach to librarianship,” “The positive and active community it builds”)
- Support (“Financially secure and professionally supported positions that allow for people to learn about and chart a career path,” “It provided me with the support and ability to value my contributions as a researcher”)
- Skills (“Exposure to [the] advanced technical landscape of information management,” “I was able to develop my project management skills”)

[The fellow’s] work was significant in impacting our strategic development and provided a basis for creating the department which now exists.

The survey of host-organization supervisors asked if the organization had implemented any permanent changes as a result of the CLIR fellowship. The most significant change, across both Sloan- and Mellon-supported organizations, was maintaining the outcomes of the projects the fellows had worked on, whether they were online projects, community outreach initiatives, or collaborative partnerships. Additionally, nearly 40 percent of the host organization representatives said they had changed their data curation practices to address needs identified or recommendations made by the fellows. Only one supervisor said that the organization had not implemented any changes related to the fellowship.

Positive changes noted by supervisors included:

- “[The fellow] did good work which was created through broad partnership inside and outside the institution. This work advanced our understanding and helped us build and sustain software curation networks.”
- “[The fellow’s] work was significant in impacting our strategic development and provided a basis for creating the department which now exists.”

An important aspect of the fellowship program is to make sure that the expectations of the host organizations align with those of the fellows. This is particularly important when the fellow expects the fellowship to be focused on a research project that will advance both the organization’s and the fellow’s goals.

As previously mentioned, one of the most important findings surfacing from all of the data collected was the recommendation for better planning. During focus group sessions and interviews, fellows emphasized the importance of making sure the host organization's goals and fellow's goals align, and that there is clarity on the goals across the organization. Both fellows and supervisors recommended that administrators, supervisors, and colleagues with an interest in the fellowship need to take time to plan and prepare for the fellow's arrival, going beyond "planning for where the fellow will sit." Fellows recommended better planning on the part of the host organization, including clearly defined projects, making certain the fellow has the resources to undertake the project, and, where possible, a match between the fellow's research interests, skills and knowledge and the project requirements. A demonstrated commitment to the fellowship by the organizational leadership was also an ongoing theme.

One supervisor discussed how, prior to reviewing potential fellows' applications, she planned her strategy for selection of the fellow based on her organization's needs. This allowed her to effectively manage the large number of applications she reviewed. Other supervisors recommended improved planning, to allow fellows and supervisors to have a better understanding of the project, the fellow's role in the project, and the project's tasks and timeline.

To illustrate the lack of planning that sometimes occurs, fellows provided examples of being asked to do things at the last minute with no time to prepare. One fellow noted a request to serve as an interpreter with no prior discussion of the role. In this case, the lack of planning resulted in the fellow's not being able to effectively translate the technological aspects of the discussions. Those findings, which echo some of the prior assessment recommendations, show the chronic need for better planning at the host organization and with the fellows; such planning should become a key initial aspect emphasized in every future CLIR fellowship project. CLIR staff should work with host organizations to address this longstanding issue.

Supervisors also said there needs to be a clear delineation of research time. Some of their suggestions included having the fellows start on campus earlier than August (allowing for a more relaxed onboarding phase that does not coincide with preparations for a new academic year), for CLIR to provide both supervisors and

fellows with more help in the first month of their fellowship, and for supervisors and fellows to have a two-year project to focus on, and a backup project ready in case the initial one is delayed or does not work out. Three supervisors in the focus group sessions echoed sentiments from other parts of the survey and focus group findings when they noted that it would be beneficial for them to have regular calls and meetings with one another, including taking advantage of time at conferences attended by program participants.

Fellows continued to emphasize the need for hosts to make certain that they have clear goals for the fellowship, supported by multiple units across the organization. Some fellows at larger academic institutions reported in their exit interviews that while the unit to which they were assigned understood their role, other units within the library and across the university lacked that understanding.

Several fellows across different cohorts identified conflicts between the goals of the host organization and the goals of the fellow. One fellow recommended that the host institution's project should be more reflective of the fellows' interests and skills; another recommended a restructuring of the CLIR application process and the host's selection process: a different application and project is needed for fellows interested in faculty positions than for fellows interested in library positions.

Another fellow's concern was that the data curation program at their host organization was operating on grants, with no institutional commitment. Echoing comments from some of the survey and focus group findings noted elsewhere in this report, two fellows said they felt that their host organization did not know what data curation was, pointing out a need for basic definitions to be built into the program and emphasized to all participating host organizations.

Finally, in assessing the impact of the fellowship program, 77 percent of the fellows surveyed (33 respondents) strongly agreed that the program had made a positive difference in their careers, while 19 percent (eight respondents) responded that they agreed with this statement. In response to questions related to impact of the fellowship on their development, the fellows emphasized the value of cohort and network development, the importance of being able to meet together in professional

settings such as the CNI and DLF conferences, and even basic opportunities to meet online to help develop valuable peer relationships.

One key question that remains important to consider in strategic development is how the program can or should adjust to changes in the working cultures of host organizations. One of the program's leaders stated:

The most pervasive change [over the program's history] is the acceptance of individuals without library degrees into the library. This has been good, because the kinds of complexities in data curation management are not going to be solved by one profession alone. Much of the change [that can be credited to the program] has been behavioral changes, not technology. (Bishoff and Claeson, CLIR Postdoctoral Fellowship Leadership Report 2020, 4)

Both fellows and program leaders noted that as the CLIR Postdoctoral Fellowship Program has matured, there has been a greater effort to address issues of social justice and race and representation. This is reflected in the Mellon-funded data curation grants creating fellowships in Latin American and Caribbean studies and African American and African studies. "Beginning in 2017, we began working with [more humanities] fellows who were interested in working with [contemporary] communities ... [F]ellows from the social sciences are more attuned to this." (Bishoff and Claeson, CLIR Postdoctoral Fellowship Leadership Report 2020, 5) The implication is that the interdisciplinary nature of the program has helped fellows draw from one another's experience when grappling with the complex social and ethical considerations that come into play when planning and implementing strategies for curating and providing access to data related to living communities.

The program leadership interviewees indicated that:

"[O]ver time, the program has become successful and the integration of scholars into the libraries has become more natural. Part of this may be due to the evolution of library jobs, but the skills of the fellows have also changed, which has led to some successful experimentation. (Bishoff and Claeson, CLIR Postdoctoral Fellowship Leadership Report 2020, 3)."

How Might the Program Be Improved, Based Upon the Experience and Feedback of Program Participants?

Over the nearly 20 years of the CLIR Postdoctoral Fellowship Program, changes have included holding midyear meetings in conjunction with the DLF Forum; allowing networking and learning opportunities for both current and alumni fellows; creating the data curation fellowships; and providing additional funding opportunities that support those fellowships. CLIR has also expanded the learning opportunities for both fellows and supervisors with regular online presentations and discussion sessions. Those changes reflect the changing academic and library environments, the maturing of the program itself, the maturation of data curation programs, and the growing sophistication of the fellows. The program has been more fully integrated with other CLIR programs, most notably the integrating of fellows and fellowship work with Digital Library Federation (DLF) activities. “This shift came pragmatically,” noted one interviewee (Bishoff and Clareson, CLIR Postdoctoral Fellowship Leadership Report 2020, 6). Another interviewee noted that the original goal of the program is still valid, while the program itself has been modified. One modification is the expansion of the definition of data; another is an expansion of the knowledge environment, so that dealing with data is a much broader issue.

Today’s program is defined more broadly—it’s no longer just zeros and ones. Today we’re more flexible We’re looking at creating opportunities for individual fellows, looking for ways to make them shine, help them get jobs from people who know CLIR. All the activities are about making the fellowship more adaptable and flexible and making the work of the fellows more visible.

Interviewees noted that additional changes can be anticipated in the post-COVID 19 era. One supervisor stated, “Today’s program is defined more broadly—it’s no longer just zeros and one. Today we’re move flexible We’re looking at creating opportunities for individual fellows, looking for ways to make them shine, help them get jobs from people who know CLIR. All the activities are about making the fellowship more adaptable and flexible and making the work of the fellows more visible.” (Bishoff and Clareson, CLIR Postdoctoral Fellowship Leadership Report, 2020, 6-7)

While the focus groups, interviews, and surveys conducted as part of this project generated positive comments about CLIR’s structure and its administration of the Postdoctoral Fellowship Program, the respondents also provided helpful suggestions to improve its impact.

Host supervisors in the focus group sessions had many comments about what they considered to be successful aspects of the fellowship projects. When asked about areas needing improvement, their comments mainly focused on the structure of the program and “alumni” activities. The supervisors emphasized the importance of negotiating the scope of the fellowship as early in the project as possible. This includes both closer work between the host and CLIR to make sure there is an understanding of the program’s goals, and communication between the fellow and supervisor to develop plans and goals as soon as possible after the fellowship begins.

A greater understanding between fellows and hosts needs to be established regarding future career opportunities at the hosting organization. Several focus group participants, both fellows and host supervisors, suggested that CLIR needs to state what the expectations are regarding host organization’s hiring fellows following the successful completion of their fellowships. Does CLIR have an expectation for future employment of the fellows by participating hosts, or, if not, will CLIR give preference to organizations that signal a willingness to hire the fellow at the end of the fellowship? That was a key concern throughout the interviews and focus groups.

In terms of the fellowship projects themselves, the issue of flexibility vs. specificity— noted as early as Brunner’s 2009 report—continues for both fellows and supervisors. During Bishoff and Clareson’s focus group interviews, supervisors indicated a preference for flexibility, allowing fellows to take more initiative, while fellows identified a need for greater specificity, particularly in the first year of the fellowship, allowing them to focus on specific project responsibilities, develop an understanding of the organization’s data curation environment and learn new skills.

During a focus group discussion, host supervisors recommended that CLIR develop a network of supervisors that could continue to work together beyond the fellowship projects [See further suggestions on this idea below]. A variety of activities were found to be of interest to the “alumni” community of fellows and hosts, including informal networking to allow cohorts of fellows and host supervisors to be able to continue working together; learning activities for fellows and supervisors, like leadership development and skills development; teaching and presenting; writing and publishing (especially collaborative writing projects); and opportunities to collaborate on projects after the fellowship is completed.

In focus group discussions, fellows mentioned concern that some supervisors had not received training on the meaning of a fellowship, or that the training proved inadequate. Ensuring a basic level of understanding of the goals and activities of the fellowship program at the host organization level is important. Also related to goals, the fellows saw a need to establish a system that could be used by hosts to evaluate or follow up on the goals of the fellowship project. Finally, the fellows emphasized the importance of ensuring that all departments at the host organization are aware of the fellowship and its goals, especially raising awareness of the departments with which the fellows will interact at the organization.

The fellows' survey responses indicated that by far the most popular CLIR-related activity that fellows have participated in since leaving their fellowship was "interaction with other former fellows from my cohort," with 32 respondents (76 percent) reporting having participated in such activities. Fellows who were appointed from 2013 to 2016 most frequently reported such participation, which makes sense, since fellows who have been out of the program for three or more years would have had more post-fellowship opportunities to engage with other former fellows.



Fig. 9: Fellowship community members at the 2022 Digital Library Federation Forum

One survey question asked about the impact of the fellowship on the fellows' own career development. They overwhelmingly indicated that the program had made a positive difference in their careers (over 95 percent agreed or strongly agreed). They also responded favorably to the alumni network as a resource for career building (nearly 80 percent agreed or strongly agreed), and said they were in regular contact with their colleagues from their CLIR Postdoctoral Fellowship (nearly 75 percent agreed or strongly agreed).

When asked to rank the kinds of support and activities that the CLIR Postdoctoral Fellowship Program could provide to alumni fellows in the next five years, respondents identified clarification of the program's mission and vision as the topmost priority; hosting more online social and networking opportunities was also popular. There was strong support as well for a variety of other activities, including hosting online opportunities for building technical skills; providing financial resources, an online platform, and guidance for organizing networking opportunities; and increasing management and leadership opportunities for fellowship supervisors.

In the host supervisor survey, respondents were asked to assign priority order to a list of possible support services and activities that CLIR could provide to host organizations and supervisors in the next five years. By far, two categories received the most top rankings: increasing guidance and support for host organizations developing position descriptions for future fellowships, and offering more management and leadership development opportunities for supervisors.

Beyond the Questions

Throughout years of doing combined survey and focus group research, consultants Bishoff and Claeson have found that the less-structured nature of the focus group sessions allows for a freer exchange of information and a way to get “beyond the questions.” The postdoctoral fellowship focus groups were designed to find out more about subjects such as collaborative work, the impact of COVID-19 on the fellowship program, the needs of fellows and host organization, and future priorities and strategies. The focus group sessions were held for both host organization supervisors and fellows.

Contingent Workers

Several of the fellows in the focus group discussions noted that their supervisors had done a lot to help them integrate into the host organizations. Not as many issues related to contingent work were raised during the focus groups, but there were some interesting suggestions. One is that libraries and other information organizations need new perspectives on their work, with some focus group participants asking if CLIR might help to turn the fellowship program into an “Executive MLS” to provide a wide view of the activities of the library. Two fellowship supervisors reported working with their organization’s human resources units specifically so that they classified the CLIR fellowships as positions with benefits. Being assigned to a library position with benefits was required by CLIR and critical to the fellows’ satisfaction and success. Supervisors noted the advantage of streamlining this process so that those in term-limited positions, like fellowships, receive benefits without a lot of effort.⁵

In another point related to the discussion above on moving fellows into continuing positions at a host organization, some of the focus group participants said that hosts need to decide early if the fellow’s position is one that will continue. The program leadership interviewees noted that there is an overall increase in contingent workers in the academy, “The more that the entire higher ed community is propped up by

⁵ Contracts between CLIR and host partners for the fellowships that are funded through Mellon and Sloan stipulate that fellows are to have benefits, and that funding is provided to support these benefits.

contingent labor, it's an issue of how we can get more of our fellows to stay" (Bishoff and Clareson, CLIR Postdoctoral Fellowship Leadership Report 2020, 5). Finally, supervisors noted that a peer support network for the fellows is important so that they can talk with their peers about the concerns contingent workers face, such as incorporating job-seeking activities into busy work schedules, making sure projects stay on time and are completed within the term, dealing with the effects of project delays, navigating bureaucracies, and conducting their own research.

Higher education responded relatively effectively in the early period of the pandemic ... through spring closures and summer planning, ... but as the new academic year opened it seems that institutions and government may not be recognizing the fears of students and faculty.

COVID-19 and Its Impact

COVID-19 was an issue for the fellows in African American and African studies and in Latin American and Caribbean Studies. Those fellows and supervisors who were affected by COVID-19 were asked what changes their organizations had made in how fellows and supervisors worked together. Supervisors noted that networking and communicating with their fellows were challenges; the use of Slack and other text-based and video communication services were seen as

helpful by both fellows and supervisors. Fellows with established relationships with international partners noted that "moving to Zoom" was not particularly disruptive, as they already used conferencing services for communication. One of the program's leaders noted, "Higher education responded relatively effectively in the early period of the pandemic ... through spring closures and summer planning, ... but as the new academic year opened it seems that institutions and government may not be recognizing the fears of students and faculty" (Bishoff and Clareson, CLIR Postdoctoral Fellowship Leadership Report 2020, 8).

How the Limitations of the COVID-19 Pandemic Affected the Fellowship

David Gwynn



Former Fellowship Supervisor
(2019-2022)

Digitization Coordinator
and Associate Professor
University of North Carolina at Greensboro
Libraries

We were fortunate in that many of the goals of the fellowship lent themselves very well to remote work, so a major realignment of goals was not necessary. We did, however, have to change our approach slightly, moving to regular virtual mentoring and progress sessions, as well as department and unit meetings. We also concentrated even more on digital scholarship for dissemination. This coincided with a reassessment of our overall workflow within the library IT department and digitization unit and has resulted in an environment that is more remote-friendly for faculty and staff, and one that (we hope) creates a more remote-friendly product for our end users.

If I have one regret about the influence of the pandemic, it was the negative effect that it had on many of our planned networking opportunities for the fellow, particularly within our physical environment. He was, however, very focused and motivated and seized on any opportunity for virtual networking and

community building. As it turns out, now that the pandemic is over and he has accepted a tenure-stream position at another university, we still find ourselves working together on a different community-based project unrelated to the fellowship. I think networking is one of the most important aspects of the fellowship, so I am very happy with the results despite some pandemic-related challenges.

How the limitations of the COVID-19 pandemic affected the fellowship

Portia Hopkins



CLIR Postdoctoral Fellow in Data Curation
for African American and African Studies
Rice University
(2020-present)

I think the biggest impact that COVID-19 had on my experience was not being able to go directly into the communities I work with to form bonds with the community. So much of oral history is built upon creating trust, and that is a difficult task to do on Zoom. Additionally, because I work with elderly communities, the pandemic was especially difficult—and dangerous—for them. It was often difficult to find people who were willing to meet in person, even when the vaccine was rolled out. Finally, we cannot discount the challenges that new technologies pose to all of us, and it was a learning curve that I had to plan for to aid the interviewees in navigating Zoom, the online submission portals for scanned photos, and online content forms.

A lot of things we had planned were devastated by COVID—travel, meetings with cohorts. [But] digital spaces’ uses, how we collect metadata, digital programming, was revolutionized due to COVID.

Several fellows indicated that they took “an emotional health hit” during the pandemic, as their projects had to be drastically changed, particularly in-person networking and activities with their cohorts and communities. However, there were also positive comments from the fellows, many of whom felt their host organizations learned a lot from the COVID-19 experience that they will be able to utilize

in similar situations. One participant noted, “A lot of things we had planned were devastated by COVID—travel, meetings with cohorts. [But] digital spaces’ uses, how we collect metadata, digital programming, was revolutionized due to COVID.”

A number of notable findings about issues related to the pandemic came up in the interviews with the 2020 fellows and host supervisors in African American and African studies.

Community outreach and involvement surfaced strongly in the 2020 cohort, perhaps accelerated by COVID-19. Workarounds for COVID-19 challenges, especially in the 2020 cohort, sometimes had surprising upsides. For example, some fellows had more opportunity for exposure to higher-level administrators. COVID-19, rather than derailing plans, prompted regrouping and project changes that made the fellows’ work more relevant and sustainable. At first the pandemic inhibited communications within host organizations and with communities, but the 2020 cohort in particular bridged these gaps well. Development of fellows’ cohort networks was slower during COVID, but the bonding experiences, especially as the pandemic waned, became much stronger. Bishoff and Claeson also learned that fellows do not necessarily need to relocate to a specific campus to be successful in these kinds of roles. The consultants began to ask: Are there ways to develop fellowship opportunities so that people do not have to uproot or destabilize themselves?

Diversity and Social Justice

The social justice movement continued to be a major factor in the experience of the 2020 cohort, as it had been for the 2019 fellows in African American and African studies. Consciousness of social justice needs and activities attracted more collaborators and support to many of the fellows’ projects. Both the 2019 and 2020

cohorts had a community emphasis. Fellows were brought in on diversity, equity, and inclusion (DEI) initiatives. Some of this community work had little to do with data curation and was more a case of being in the right place at a good time with a relevant set of skills to have impact on a community. See the recommendations section, below, for more information about expanding social-justice related work.

Fellows reported that their organizations made efforts to address the issues identified by social justice movements. As noted, many organizations established unit-level DEI committees, while others worked on metadata policies that addressed use of language on websites and metadata records. All this was seen as productive, but several 2020 fellows believed that “it was surface level issues, rather than getting at the real matters associated with the social justice movements.” Fellows suggested that training in cultural competency is needed. An opportunity exists here for CLIR to collaborate with other professional organizations, such as the Society of American Archivists, the Association for College and Research Libraries, and the Historically Black Colleges and University (HBCU) Library Alliance. What’s more, 2017-2020 fellows can delve further into the matter of cultural competency, identifying strategies for libraries to go beyond the surface issues. Further ideas related to this topic are explored in the “**Priorities**” section, below.

Priorities for the Future of the Program

Throughout the evaluation, priorities for future directions have been identified. Many have been covered in earlier sections of this report; others deserve to be highlighted here.

Fellows noted that they appreciate both flexibility and structure in their fellowships, but that having structure that results from initial goal setting and planning, with flexibility as the project moves forward, is paramount to both project and fellowship success.

As discussed throughout this report, a key method to improve the success of the program for both fellows and host supervisors is the early setting of goals and development of plans for the fellowship. The development of CLIR onboarding guides may help to develop a “culture of project planning,” but the consultants see a constant need to update and strengthen these guidelines as new knowledge is gained from future fellowships.

In the surveys and in the focus groups, fellows noted that they appreciate both flexibility and structure in their fellowships, but that having structure that results from initial goal setting and planning, with flexibility as the project moves forward, is paramount to both project and fellowship success.

Other administrative issues include the need for greater understanding and support for postdoctoral fellows in university and library human resources departments, particularly at the beginning but also continuing throughout the fellowship. Issues associated with contingent work were raised frequently, especially in the initial individual interviews with recent fellowship participants. Fitting into an organization’s culture can present challenges for contingent staff, often leading to a sense of isolation. Making sure the fellow has an opportunity to meet with others in contingent roles in the organization has relieved some of these concerns at host sites.

Career development was a focus of both fellows and supervisors, with divergent opinions on the role of the host organization in assisting in the development of the fellow’s career. At the program’s inception, one of the key goals was to develop fellows for future library careers. The fellows’ survey found that 35 percent of respondents were currently employed in permanent or tenure track positions in an academic library, while 17 percent held permanent or tenure track positions as academic faculty, and 12 percent held positions in government agencies (Bishoff and Claeson, CLIR Postdoctoral Fellowship Fellows Survey Report 2021, 6). These

government agency hires were mostly from data curation fellows in the sciences and social sciences and in Latin American and Caribbean studies. Additionally, two hires from the sciences and social sciences now work in nonprofit organizations. Other than these reported positions, there were not a lot of differences across cohort type.

Common themes from fellows' responses included a lack of clarity regarding post-fellowship employment opportunities and an inability to undertake their own research agendas as part of their fellowship activities. While many fellows—particularly among the humanities data curation cohorts—shared disappointment in not being offered a permanent position where they were placed, supervisors reported that 40 percent of the organizations had hired the fellow after the completion of the fellowship. Among former supervisors, 47 percent reported not having an open position (Bishoff and Claeson, *CLIR Postdoctoral Fellowship Host Survey Report 2020*, 3).

Closely related to the issue of career development is the host organization's approach to staffing for their data curation programs and initiatives. Fellows from the cohorts in medieval studies and in Latin American and Caribbean studies reported that their host organization was using grants to support ongoing staffing, rather than making a commitment to hiring permanent staff for the data curation program. For organizations that have adopted this approach, post-fellowship employment of the fellow is unlikely unless the fellow can write a successful grant that will fund their position. Transparency is needed regarding this approach to minimize frustration on the part of the fellow as well as the host organization.

Another key topic, heard especially in the individual interviews with fellows, was developing greater clarity about the possibility of career development at the host organization. Fellows asked that the host representatives be more forthcoming and transparent about these issues.

At the start of the consultants' research, there was a great deal of discussion on whether the fellowships should, as a rule, be extended to three years. Several of the fellows in the African American and African studies cohorts have had the opportunity to extend their fellowships to four years because of missed activities during the pandemic. Extending the length of the fellowships had been a discussion

point in the individual interviews with fellows and supervisors, and the discussions with CLIR program administrators. Throughout these discussions there has not been a consistent opinion across the interviewees. Fellows and supervisors note benefits to both two-year and three-year terms.

Expanding professional development and continuing-education opportunities for program participants and host supervisors is widely recognized as a priority for improvement. This includes opportunities both during and after the fellowship period. Several former fellows noted a lack of training from host organizations during the fellowship as a concern, although no host supervisors noted this. Especially needed, according to focus group participants, was instruction to train fellows who had academic training but did not have a library background or a graduate degree in library science.

Several host supervisors mentioned a need for more library-wide DEI discussion and training. Other issues that arose in relation to social justice and racial equity include involvement of more HBCUs in the program, including addressing issues of training, orientation, and capacity-building. Both fellows and supervisors recommended that CLIR provide cultural competency training, bringing on a resource person throughout the duration of the fellowship. The consultants believe that once we see more diversity within academic and cultural organizations, it will be more broadly recognized that it is not enough to just care; organizations have to implement changes to set people up for success. This could be a potential topic for a larger CLIR initiative and could be piloted within the postdoc community. Another topic is a focus group across all of the fellows and alumni to discuss effects of COVID on the field.

Expansion of the number and type of networking activities was of interest to both fellows and supervisors. Both currently active hosts and fellows and “alumni” expressed the need for, and can benefit from, these longer-term educational and collaborative efforts. Building in training and mentoring activities for the fellows and supervisors, both during and after the program, was suggested by focus group and survey participants. These activities can serve as professional development, as well as a social and networking tool for the program.

A method to provide continuing education in a way that can benefit past and current fellows and host representatives alike, and that can take advantage of the findings in this report and the experiences gained in the overall program, is to hold a community meeting in 2024. This would coincide with the 20th anniversary of the initiation of the Postdoctoral Fellowship Program.

Questions that a community meeting could address include:

- Were the goals originally established in 2003 achieved?
- What are the current and future needs of the data curation field?
- What is the role of data curation specialists in 2030?
- What is the role of the PhD in advancing the library's role in data curation and the academy?

These issues and others raised in this report can serve to steer the agenda at a community meeting that could be both reflective and future-facing.

Finally, an additional initiative suggested in the program leadership interviews is the concept of a “virtual college.” The interviewee noted that the fellows’ expertise and knowledge is not sufficiently capitalized on. Fellows and former fellows do not have a method to share what they know with the broader data curation field or with individuals in their fields of expertise. The “virtual college” would provide a way for the fellows to share their experiences, a way to capture their insights over time.

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About the Authors

Liz Bishoff is the managing partner of The Bishoff Group, a consulting group that works with libraries and cultural heritage organizations in the United States on a range of matters associated with digital program development and implementation. She has worked across varying library and cultural heritage communities guiding the development of best practices in the area of metadata creation, digitization, and digital preservation. Bishoff is a member of the American Library Association, serving as treasurer, board member, and member of the ALA Council. She has extensive grant writing and implementation experience, receiving grants from the Institute of Museum and Library Services, the National Endowment for the Humanities, and the Colorado State Library. She has taught graduate-level course at Emporia State University and at Dominican University in Illinois. Bishoff was also a member of the Society of American Archivists' Digital Archives Specialist Subcommittee, working to develop the SAA's Digital Archives Specialist Certificate.

Thomas F. R. Clareson is senior consultant for digital and preservation services at Lyrasis, a community-supported nonprofit group that works with more than 2,000 archives, libraries, and museums worldwide. He consults internationally on preservation, disaster preparedness, digitization, funding, strategic planning, program evaluation, and advocacy for arts and cultural organizations. He serves as director of the Performing Arts Readiness Project, funded by the Mellon Foundation, to help performing arts organizations protect their assets, sustain operations, and prepare for emergencies. Clareson is also vice president of the board of directors of the Foundation for Advancement in Conservation, and vice chair of the National Board of Advisers of the Ross Art Museum at Ohio Wesleyan University. He has taught graduate-level courses at the University of Texas at Austin, the University of California at Los Angeles, and the University of Illinois at Urbana-Champaign.

Appendix A

A1. Pre-Interview Survey and Interview Guide for Fellows

A2. Pre-Interview Survey

Welcome and Introduction

In 2018, CLIR received funding from The Andrew W. Mellon Foundation to evaluate the CLIR/DLF Postdoctoral Fellowships in Data Curation for the Humanities. CLIR has contracted with independent consultants, Liz Bishoff of The Bishoff Group and Tom Claerson of Lyrasis, to lead the evaluation. They have designed this pre-interview survey to help prepare a series of phone interviews with postdoctoral fellows.

This survey will collect information about:

- the types of research data curated during your fellowship;
- the data curation and other data-related activities performed during your fellowship;
- the training and other professional development support you received;
- communication with your supervisor, other fellows, and CLIR; and
- recommendations to CLIR regarding future postdoctoral fellowship programs.

Your responses will not be viewed by anyone except the consultants, who will aggregate information prior to sharing with the CLIR to assure anonymity. Liz will conduct phone interviews with the fellows.

The survey will take approximately 15-20 minutes to complete. You may enter and exit the survey at any time. There is an icon in the upper-right-hand corner of the screen that you can use to exit the survey. To exit/re-enter the survey, you will need to enable cookies on your browser, as this is the way Survey Monkey tracks the respondent. Additionally, you will need to use the same browser and device in order to complete the survey.

Sincerely,

Christa Williford
Director, Research and Assessment

A1. Pre Interview Survey

Demographic Information

1. Demographic Information

Fellow's Name:

Host Institution Name:

Library/Department Name

Email Address:

Phone No.:

Data Collections and the Fellowship

This section of the survey will collect information regarding the data types that you curated during your fellowship as well as the source of that data.

2. What types of research data did you curate during your fellowship? Select all that apply.

- Library collection or item-level data, such as finding aids, catalog records, or other metadata that support search and discovery. Accession records, usage data, data about teaching/learning activities.
- Encoded versions of primary source text.
- Analog audio or audio-visual recordings that were digitized.
- Born-digital audio or audio-visual records.
- Other born-digital files, such as text or images.
- 2-dimensional or 3-dimensional works of art that were digitized, excluding manuscripts.
- Photos, including negatives, that were digitized.
- Books, manuscripts, and other textual materials that were digitized.
- Geospatial data.
- Numeric data sets.
- Software programs, operating systems, etc.
- I did not curate any types of data.

Discuss other types of research data that you curated.

3. What was the source of the research data that you curated? Select all that apply.

- Data from legacy digital projects.
- Research data from researchers at my host institution.
- Research data from researchers at other institutions.
- Research data that was part of the my personal collection.
- Research data from a research group that I was a member of.

Discuss other sources of the research data.

Data Curation Activities in the Fellowship

The following questions pertain to your work in the area of data curation. For the purpose of this assessment, we draw a distinction between data curation work as “the active and ongoing management of data through its life cycle” (Question 4) and other data-related work, such as conducting outreach, promotion, assessment, instruction, or policy development related to data infrastructures or services (Question 5).

4. Indicate which of the following data curation activities you performed during your fellowship.

Select all that apply.

- Created cataloging records, finding aids or other search/discovery tools.
- Created a website to support use of data collections.
- Data analysis.
- Data appraisal.
- Data gathering.
- Data harvesting.
- Data migration.
- Digital preservation implementation, such as ingesting collections to preservation systems.
- Digital preservation planning.
- Digitization/reformatting
- Documentation of data curation workflows/procedures.
- Metadata creation.
- Metadata enhancement.
- Mark-up, such as text encoding.
- I did not undertake any data curation activities.

Discuss other data curation activities you performed during your fellowship.

5. Indicate which of the following data-related activities you performed during your fellowship.

Select all that apply.

- Drafted institutional policies related to data infrastructures/services.
- Drafted an institutional data management plan.
- Provided data management consultations, such as creating data management plans for digital projects.
- Taught course/workshop on data management and/or use.
- Conducted an assessment of data management practices of a specific researcher, team or department.
- Developed a website related to data collections or services.
- Developed a promotional/outreach program related to the data collections and/or services.
- I did not perform any data-related activities.

Discuss other data-related activities you undertook during your fellowship.

Data Curation Experience and Skills

The following questions will gather information about the skills you brought to your fellowship, as well as the skills your fellowship enabled you to develop.

6. Indicate your length of experience with the following skills prior to your fellowship.

	None at all	Less than 6 months	6-12 months	1-2 years	3+ years
Text mark-up.					
MARC record cataloging.					
Metadata creation.					
Digitization/reformatting original content.					
Metadata harvesting using OAI-PMH.					
GIS					
Database design.					
Coding.					
Version control using GitHub or similar service.					
Web programming.					
Web design.					
Basic data management (organizing digital files.)					
Basic digital preservation (creating checksums, etc.)					
List other technical skills and length of experience prior to your fellowship.					

7. Indicate the level of learning or improvement on the following technical skills during your fellowship.

	I never learned this skill.	I have some skill but did not improve.	I developed skills, but not enough to work independently.	I developed skills to work independently with reference to instructions.	I am comfortable teaching these skills to others.
Text mark-up.					
MARC record cataloging.					
Metadata creation.					
Digitization/reformatting original content.					
Metadata harvesting using OAI-PMH.					

GIS					
Database design.					
Coding.					
Version control using GitHub or similar service.					
Web programming.					
Web design.					
Basic data management (organizing digital files.)					
Basic digital preservation (creating checksums, etc.)					
List other relevant technical skills and the level of learning or improvement during your fellowship.					

8. Indicate your length of experience with the following non-technical skills prior to your fellowship.					
	None at all	1-3 months	3-6 months	6-12 months	1+ years
Project management.					
Planning and leading meetings.					
Writing for audiences outside my discipline.					
Giving lectures for non-academic audiences.					
Creating exhibits.					
Teaching workshops/webinars.					
Database design.					
Writing grant applications.					
Developing institutional policies.					
Job seeking.					
List other relevant non-technical skills and the length of experience prior to your fellowship.					

9. Indicate your level of learning or improvement on the following non-technical skills during your fellowship.					
	I never learned this skill.	I have some skill but did not improve.	I developed skills, but not enough to work independently.	I developed skills to work independently with reference to instructions.	I am comfortable teaching these skills to others.
Project management.					
Planning and leading meetings.					
Writing for audiences outside my discipline.					
Giving lectures for non-academic audiences.					
Creating exhibits.					
Teaching workshops/webinars.					
Database design.					
Writing grant applications.					
Developing institutional policies.					
Job seeking.					
List other relevant non-technical skills and the level of understanding knowledge gained during your fellowship.					

10. What skills do you wish you had learned during your fellowship that you did not?

Communication

These questions relate to the communication between CLIR and the fellow, as well as the fellow, the host institution, and the fellow's cohort. Please share how communication may have changed or been impacted by COVID-19.

11. On average how frequently did you meet with your host institution supervisor(s) during the course of your fellowship? Select only one answer.

- Weekly.
- Bi-weekly.
- Monthly.
- As needed.
- When I set up an appointment.
- When my supervisor(s) set up an appointment.
- I don't remember.

Add any comments regarding frequency of communication.

12. Please indicate your level of agreement with the following statements regarding communication.							
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know	N/A
Communication with CLIR about the program was timely.							
CLIR provided information that allowed me to make effective decisions.							
Information from CLIR allowed for timely decision making.							
Communication with my supervisor(s) supported the project's success.							
Communication with my supervisor(s) allowed for timely decision making.							
Communication with my supervisor(s) allowed me to make progress on the project.							
Communication with my supervisor(s) allowed problems to be addressed in a timely manner.							

During COVID-19 I believe my supervisor and I developed effective means of communication.							
A plan for communication with my supervisor was established early in my tenure.							
Please share any comments regarding communication.							

13. Indicate your level of agreement with the following statements regarding communication with other fellows in your cohort.							
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know	N/A
Communication with my cohort supported my data curation activities.							
Communication with my cohort advanced my research goals.							
My cohort shared information related to the CLIR program that I didn't get anywhere else.							
My cohort shared career information that supported my fellowship.							
My cohort shared information that helped me solve data curation challenges.							
During COVID-19 I communicated more with my cohort.							
Share any comments regarding communication with fellows in your cohort.							

Conclusion and thank you

14. What do you consider the most important outcome of your fellowship? Rank your responses from most important to least important with “1” being the most important and “12” being the least important.

- The curation of one or more important collections.
- The completion of the activities defined in the fellowship proposal.
- The collaboration with one or more scholars on the defined project.
- The networking with other CLIR fellows in my cohort.
- The learning of data curation skills so I can apply them in the future.
- The ability to continue to work on my research.
- The building of my résumé, adding data curation skills and knowledge.
- The ability to meet other scholars in my field.
- The sharing with others the importance of data curation.
- The advancing of the library’s role in data curation.
- The expansion of my knowledge of the library’s role in data curation.
- I got a job doing data curation.

15. What was the biggest impact of COVID-19 on your fellowship experience?

16. Would you recommend that other recent PhDs submit an application to become a CLIR postdoctoral fellow?

- Yes
- No
- Maybe

If you responded ‘No’ or ‘Maybe’, comment on what factors might make you more likely to recommend the fellowship to others.

17. What advice would you give CLIR regarding the development of future CLIR postdoctoral fellows and fellowships?

A2. Interview Guide

Introductory information

- Evaluator Introduction
- Background information: Brief review of the purpose of the interview
- Objectives:
 - Identify data curation challenges that emerged during the data curation fellowship and how these challenges were addressed.
 - Identify what fellows learned about curation.
 - Gather information on the impact of the pandemic on the fellowship experience.
 - Gather information on the impact of the pandemic on data curation efforts.
 - Gather information on the impact of recent social justice movements on data curation.
 - Obtain information regarding collaborative efforts on data curation.
 - Obtain information regarding benefits of data curation to organizations participating in the CLIR Postdoctoral Fellowship program.
 - Obtain input regarding changes in the program that can be incorporated into future CLIR Postdoctoral Fellowships.

Interview Questions

- Did your goals or project change over the period of your fellowship? What was your role in changing the project? What was the overall impact on your fellowship of this change?
- What were the major successes or milestones you reached during your fellowship? If appropriate, describe how you realized them during the pandemic.
- What, if any, were the major data curation challenges or barriers that you encountered during your fellowship? How were they addressed by your host organization, your supervisor and/or CLIR?
- What were the major non-data-curation challenges you faced during your fellowship, and how were they addressed?
 - Did COVID-19 present challenges to you accomplishing the project goals and/or activities? How did you address these challenges?
- Do you believe your host institution's approach to data curation changed because of your fellowship?
- How did your fellowship inform data curation at your institution?
 - During your fellowship time, the world experienced a global pandemic and increased global attention to movements for social justice.
 - Did your organization make, or attempt to make, any changes in priorities or practices in order to address any issues related to social justice? If so what were they, and how were you involved?
 - How have these major environmental changes impacted data curation priorities or practices?
 - What, if any, changes has your organization undertaken as a result of the pandemic and contemporary social justice movements?
- What organizations or departments on campus did you collaborate with during the fellowship? What organizations or departments might be future collaborators? Please share any insights into these collaborative activities as they relate to the success of your project/s or your fellowship.

-
- As a fellow, you may have been considered “contingent” staff by your host organization (e.g. fixed-term, term-limited, temporary, etc.).
 - If this was the case, what issues did you encounter? Did these issues impact your ability to meet the fellowship’s goals and activities?
 - What would you recommend to your host organization and CLIR to address the impact of being contingent staff?
 - What do you believe were the primary benefits of the fellowship to you?
 - Several of the fellows accepted extensions increasing the fellowship from two to four years. Share with us the benefits of this extension, including examples of what you have accomplished that you wouldn’t have accomplished in the two-year fellowship.
 - What recommendations do you have for CLIR for future postdoctoral fellows and fellowships?
 - Please share any additional comments regarding your fellowship that you haven’t already shared.

Data Curation definition: The University of Illinois’ Graduate School of Library and Information Science defines data curation as “the active and ongoing management of data through its life cycle of interest and usefulness.” This life cycle comprises steps of conceptualizing, creating, accessing, using, appraising, selecting, disposing, ingesting, reappraising, storing, reusing, and transforming data. During this process, data might be annotated, tagged, presented, and published for various purposes. Data curation means active management of data, reducing threats to their long-term value and mitigating digital obsolescence. The privacy and autonomy of source communities and the proprietary nature of many data are key considerations in enacting data curation strategies.

Appendix B

B1. Pre-Interview Survey and Interview Guide for Supervisors

B2. Pre-Interview Survey

Welcome and Introduction

In 2018, CLIR received funding from The Andrew W. Mellon Foundation to evaluate the CLIR/DLF Postdoctoral Fellowships in Data Curation for the Humanities. CLIR has contracted with independent consultants, Liz Bishoff of The Bishoff Group and Tom Claeson of Lyrasis, to lead the evaluation. They have designed this pre-interview survey to help prepare a series of phone interviews with representative hosts of the fellows in data curation for Latin American and Caribbean studies and in data curation for African American and African studies.

This survey will collect information about:

- the types of research data that the fellows curated;
- the data curation and other data-related activities they performed;
- the training and other professional development support they required, communication with the fellow and with CLIR; and
- recommendations for future hosts.

The results of the survey will not be viewed by anyone except the consultants, who will aggregate information prior to sharing with the CLIR to assure anonymity. Tom will conduct phone interviews with the supervisors. The survey will take approximately 15-20 minutes to complete. You may enter and exit the survey at any time. There is an icon in the upper-right-hand corner of the screen to allow you to exit the survey. To exit/re-enter the survey, you will need to enable cookies on your browser, as this is the way Survey Monkey tracks the respondent. Additionally, you will need to use the same browser and the same device in order to complete the survey.

Sincerely,

Christa Williford
Director, Research and Assessment

B1. Interview Guide

Demographic Information

1. Demographic Information

Supervisor Name:

Host Institution Name:

Library/Department Name:

Email Address:

Phone No.:

Data Collections and the Fellowship

This section of the survey will collect information regarding the data types that the fellow curated as well as the source of that data.

2. What types of research data were curated by the fellow? Select all that apply.

- Library collection or item-level data, such as finding aids, catalog records, or other metadata that support search and discovery. Accession records, usage data, data about teaching/learning activities.
- Encoded versions of primary source text.
- Analog audio or audio-visual recordings that were digitized.
- Born-digital audio or audio-visual records.
- Other born-digital files, such as text or images.
- 2-dimensional or 3-dimensional works of art that were digitized, excluding manuscripts.
- Photos, including negatives, that were digitized.
- Books, manuscripts, and other textual materials that were digitized.
- Geospatial data.
- Numeric data sets.
- Software programs, operating systems etc.
- Our fellow did not curate any types of data.
- I don't know.

Discuss other types of research data your fellow curated.

3. What was the source of the research data that was curated by the fellow? Select all that apply.

- Data from legacy digital projects.
- Research data from researchers at the host institution.
- Research data from researchers at other institutions.

- Research data that was part of the fellow's personal collection.
- Research data from a research group that the fellow was a member of.
- I don't know.

Discuss other sources of the research data.

Data Curation Activities in the Fellowship

The following questions pertain to your fellow's work in the area of data curation. For the purposes of this assessment, we draw a distinction between data curation work as "the active and ongoing management of data through its life cycle" (Question 4) and other data-related work, such as conducting outreach, promotion, assessment, instruction, or policy development related to data infrastructures or services (Question 5).

4. Indicate which of the following data curation activities your fellow performed during the fellowship.

Select all that apply.

- Created cataloging records, finding aids or other search/discovery tools.
- Created a website to support use of data collections.
- Data analysis.
- Data appraisal.
- Data gathering.
- Data harvesting.
- Data migration.
- Digital preservation implementation, such as ingesting collections to preservation systems.
- Digital preservation planning.
- Digitization/reformatting
- Documentation of data curation workflows/procedures.
- Metadata creation.
- Metadata enhancement.
- Mark-up, such as text encoding.
- I don't know.
- Our fellow did not undertake any data curation activities.

Discuss other data curation activities performed by the fellow.

5. Indicate which of the following data-related activities your fellow performed during the fellowship.

Select all that apply.

- Drafted institutional policies related to data infrastructures/services.
- Drafted an institutional data management plan.
- Provided data management consultations, such as creating data management plans for digital projects.
- Taught course/workshop on data management and/or use.

- Conducted an assessment of data management practices of a specific researcher, team or department.
- Developed a website related to data collections or services.
- Developed a promotional/outreach program related to the data collections and/or services.
- I don't know.
- Our fellow did not perform any data-related activities.

Other data-related activities undertaken by the fellow.

Postdoctoral Fellowship Support

6. Indicate the types of training/support that were provided to the fellow. Select all that apply.

- Training on the software that our local data curation team uses.
- Training on how to create catalog records using MARC.
- Training on how to create metadata records using Dublin Core or another metadata schema.
- Training on text mark-up.
- Training on web development skills.
- Training in programming or scripting languages.
- Assistance juggling multiple priorities.
- Guidance adjusting to our institution's work schedule.
- Assistance with personal issues (moving, housing, taxes, etc.).
- Our fellow didn't require any support.
- I don't know if our fellow required any support.

Indicate other types of support you provided the fellow.

7. Which strategies did you use to support your fellow's training needs? Select all that apply.

- Release time to take a specific data curation class or workshop.
- Release time to take relevant library school courses.
- Specific instruction on software used for the project.
- We provided guidance on all aspects of data curation used in our department/library.
- We assigned a colleague who mentored the fellow.
- No additional assistance was offered; the fellow learned on their own.

What other training or support did you or your institution provide your fellow?

Communication

These questions relate to the communication between CLIR and the host institution, as well as the host institution and the fellow. We recognize that COVID-19 may have affected when and how you communicated with your fellow. Please share these changes.

8. On average, how frequently did you meet with your fellow during the course of the fellowship? Select only one answer.

- Weekly.
- Bi-weekly.
- Monthly.
- As needed.
- When my fellow set up an appointment.
- I don't remember.

Share comments relating to frequency of communication.

9. Indicate your level of agreement with the following statements regarding communication.							
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know	N/A
Communication with CLIR about the program was timely.							
CLIR provided information that allowed my institution to make effective decisions.							
Information from CLIR allowed for timely decision making.							
Communication with my fellow supported success in the project.							
Communication with my fellow allowed for timely decision making.							
Communication with my fellow allowed me to understand progress on the project.							
Communication with my fellow allowed problems to be addressed in a timely manner.							

COVID-19 had a major impact in the effectiveness of communication with the fellow.							
Our organization provided tools to assure effective communication with the fellow.							
A communication plan with my fellow was established early in their tenure.							
Share any comments regarding communication.							

Conclusion and thank you

10. Please share how COVID-19 affected your fellow's experience.

11. Would you consider submitting an application to host a CLIR postdoctoral fellow again? Select only one.

- Yes
- No
- Maybe

If no or maybe, what changes need to be made for you to consider being a host institution again?

12. What advice would you give future host institutions?

B2. Interview Guide

Introductory information

- Evaluator Introduction
- Background information: Brief review of the purpose of the interview
- Objectives:
 - Identify data curation challenges that emerged during the data curation fellowship and how these challenges were addressed.
 - Identify what host institutions learned about data curation.
 - Gather information on the impact of the pandemic on the fellowship experience
 - Gather information on the impact of the pandemic on data curation efforts.
 - Gather information on the impact of contemporary social justice movements (e.g., protests/campaigns against police violence in Black communities, against gentrification, deportation, student loan debt, health and economic inequality, or voter suppression, for affordable housing, immigrant rights, indigenous rights, climate justice) on data curation,
 - Obtain information regarding collaborative efforts on data curation,
 - Obtain information regarding benefits of data curation to organizations participating in the CLIR postdoctoral fellowship program,
 - Obtain input regarding changes that can be incorporated in future CLIR postdoctoral programs.

Interview Questions

- Briefly describe the postdoctoral fellowship project (2-3 sentences). Describe your role as the supervisor.
- Has the purpose or goal/s of the project changed or been modified? If so what were the changes?
- What were—or have been so far—the key successes during the fellow’s time at your organization?
- What challenges or barriers were or have been encountered during the fellowship? How were they addressed?
- Has the library/department where the fellow worked implemented any permanent changes in the way data or other digital resources are managed/curated due to the fellowship?
- What was the impact of COVID-19 and the contemporary social justice movements on the fellow, the fellowship and your organization?
 - Has the global pandemic or contemporary social justice movements presented challenges to you and the fellow in accomplishing the project goals and/or activities? How did you address these challenges?
 - Did your organization implement changes in its data curation priorities or practices in order to address any issues related to the contemporary social justice movements? Was the fellow involved in making these changes? If so, what was the fellow’s role?
 - What changes has your organization made as a result of COVID-19 and contemporary social justice movements that might affect future fellowships and fellows?
- What, if anything, did your organization learn about data curation from being part of the fellowship program?
- What organizations or campus departments might you collaborate with on future data curation projects? In the larger digital library/digital humanities community?

- For many organizations, the fellow has been considered a “contingent” worker (e.g., a fixed term, term-limited, or temporary employee).
 - If this was the case, what, if any, issues did you or the fellow encounter as a result of having this status?
 - Did these issues affect the fellow’s ability to meet the fellowship’s goals and activities?
 - What changes might you recommend to mitigate the impacts of the fellow’s status as a contingent worker?
- Overall, has your organization or department’s culture changed in any way because of having the fellow as a member of the staff?
- What recommendations do you have for CLIR for future postdoctoral fellows and fellowships?
- Please share any additional comments regarding the fellowship that you haven’t already shared.

Data Curation definition: The University of Illinois’ Graduate School of Library and Information Science defines data curation as “the active and ongoing management of data through its life cycle of interest and usefulness.” This life cycle comprises steps of conceptualizing, creating, accessing, using, appraising, selecting, disposing, ingesting, reappraising, storing, reusing, and transforming data. During this process, data might be annotated, tagged, presented, and published for various purposes. Data curation means active management of data, reducing threats to its long-term value and mitigating digital obsolescence.

The privacy and autonomy of source communities and the proprietary nature of much data are key considerations in enacting data curation strategies.

Appendix C

C1. Interview Guide for Program Leaders

1. How long have you worked with the CLIR postdoctoral fellowship program? How long have you worked with the data curation fellowship program? What has been your primary role?
2. What do you see as the primary goals of the data curation fellowship program? From your perspective, how have these goals been met? Are there areas in which the program has been modified to meet the goals? If so, how?
3. How has the environment that the program operates within changed over its history, and how has that affected the program? What specific adjustments or changes in focus have been made?
4. From your perspective, how have the host institutions' interests changed in relation to data curation, and how has that affected the fellows and the program?
5. From your perspective, how have the fellows changed over the history of the program? Are today's recent postdoctoral candidates different from those you met in earlier years? If so, how?
6. How has the data curation fellowship program been modified to accommodate changes at the host institutions and differences between today's fellows and fellows of the early 21st century?
7. What directions does the data curation fellowship program need to take, at the host institution level and at CLIR? *Probe:* Does the goal or purpose of the program remain the same? Does how the goal is realized change in any way? If so, how?
8. The assessment has identified several findings that CLIR and host institutions might address. How might the program or other future programs address these?
 - a. Fellows are part of the nontenured faculty and temporary workers at the host organization, making it difficult for them integrate into the institutional environment.
 - b. Several of the fellows' projects were legacy projects with no campus or library champion, resulting in a "siloing" of the project and the fellow. This situation leads to a feeling of isolation for the fellow.
 - c. Recent fellowships have moved away from the traditional data curation technology areas into the nontechnical areas of data curation, such as community engagement, networking both locally and internationally, and teaching. Different skills, training and tools are required for these activities.
9. What information from this evaluation project is critical for the future development of the program?
10. What do you see as the value in continuing the CLIR data curation fellowship program in the future?

Appendix D

Survey for Current and Former Data and Software Curation Fellows, 2021

Welcome and Introduction

The Council on Library and Information Research has received funding from The Andrew W. Mellon Foundation to support a survey of all data curation postdoctoral fellows since 2012. CLIR has contracted with independent consultants, Liz Bishoff of The Bishoff Group and Tom Clareson of Lyasis, to conduct this survey.

This survey will collect information about:

- your fellowship experiences;
- your post-fellowship experiences; and
- your views on the most significant impacts of the fellowship program.

Your responses will not be viewed by anyone except the consultants, who will aggregate information prior to sharing with CLIR, to assure anonymity.

The survey will take approximately 20 minutes to complete. You may enter and exit the survey at any time. There is an icon in the upper-right-hand corner of the screen that you can use to exit the survey. To exit and re-enter, you will need to enable cookies on your browser, as this is the way Survey Monkey tracks the respondents. Additionally, you will need to use the same browser and the same device to complete the survey.

Be sure to click on the DONE button to submit your survey. Once you have submitted your survey, you cannot return to update or change your answers.

Sincerely,

Christa Williford

Senior Director, Research and Assessment

Demographic Information

This section of the survey collects information that will help the evaluation team analyze survey results.

*** 1. What year did your CLIR Postdoctoral Fellowship begin? Select only one answer.**

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019

*** 2. Which of the following types of fellowships did you or do you hold? Select only one answer.**

- Data curation for African American and African studies
- Data curation for early modern studies
- Data curation for energy economics or energy social science
- Data curation for Latin American and Caribbean studies
- Data curation for medieval studies
- Data curation for the sciences and social sciences
- Data curation for visual studies
- Software curation

*** 3. Which gender identity do you identify with? Select only one answer.**

- Woman (including Transgender woman)
- Man (including Transgender man)
- Gender variant/Non-conforming
- I prefer not to answer.
- Specify other gender identity

*** 4. Which racial or ethnic group do you most identify with? Select all that apply.**

- White or Caucasian
- Black or African American
- Hispanic or Latinx
- Asian or Asian American
- American Indian or Alaska Native
- Native Hawaiian or other Pacific Islander
- I prefer not to answer
- If needed, identify another racial or ethnic group that you identify with:

*** 5. Describe your current or most recent position. If you are working more than one position, please select the primary position. Select all that apply.**

- Permanent or tenure-track position at an academic library
- Contingent or term-limited position at an academic library
- Permanent or tenure-track position as academic faculty
- Contingent or term-limited position as academic faculty
- Position neither faculty nor library appointment at an academic institution
- Position at a government agency
- Position at a museum or other cultural heritage organization
- Position at a nonprofit organization
- Postdoctoral fellowship (CLIR or other)
- Position in private industry
- Self-employed
- Describe your current or recent primary position if not listed above:

Fellowship Experience

This section of the survey will collect information regarding your experience as a CLIR postdoctoral fellow, focusing on areas of responsibility, accomplishments, and the impact you had on your host institution during your fellowship.

6. Which of the following were among your significant responsibilities during your fellowship? Select all that apply.

- Implementing a specific project or projects
- Conducting a needs assessment
- Planning for strategies to meet identified needs
- Creating and delivering education and training (e.g., workshops, one-on-one consultations).
- Contributing to infrastructure development
- Contributing to software development
- Contributing to software implementation
- Conducting community outreach on campus and/or outside the institution
- Promoting the use of specific collection/s
- Contributing to the digitization of materials
- Contributing to the creation of metadata

Share any additional responsibilities you undertook during your fellowship:

7. Which of the following were or will be among the most significant accomplishments by the end of your fellowship? Select all that apply.

- Implementing a specific project or projects
- Conducting a needs assessment
- Planning for strategies to meet identified needs
- Creating and delivering education and training (e.g., workshops, one-on-one consultations) Contributing to infrastructure development
- Contributing to software development
- Contributing to software implementation
- Conducting community outreach on campus and/or outside the institution Promoting the use of specific collection(s)
- Contributing to the digitization of materials
- Contributing to the creation of metadata

Share additional comments regarding your significant contributions.

8. For each area of responsibility below, choose the statement that best describes the impact of your work as a fellow on your host institution.					
	I was able (or will be able) to make a positive impact	I was able (or will be able) to make a moderate impact	I made (or will make) no impact	I don't know	I did (or do not) have this responsibility
Implementing a specific project or projects					
Conducting a needs assessment					
Planning strategies to meet identified needs					
Creating and delivering education and training (e.g., workshops, one-on-one consultations)					
Contributing to infrastructure development					
Contributing to software development, including tools					
Contributing to software implementation					
Conducting community outreach both on campus and outside the institution					

Contributing to the digitization of collections					
Contributing to the creation of metadata					
Promoting the use of one or more specific collections					
Comment on the impact of your work as a fellow on your host institution.					

9. For each area of responsibility below, choose the statement that best describes the impact that your work as a fellow had or will have on the field of data or software curation.

	I was able (or will be able) to make a positive impact	I was able (or will be able) to make a moderate impact	I made (or will make) no impact	I don't know	I did (or do not) have this responsibility
Implementing a specific project or projects					
Conducting a needs assessment					
Planning strategies to meet identified needs					
Creating and delivering education and training (e.g., workshops, one-on-one consultations)					
Contributing to infrastructure development					
Contributing to software development, including tools					
Contributing to software implementation					
Conducting community outreach both on campus and outside the institution					
Contributing to the digitization of collections					
Contributing to the creation of metadata					
Promoting the use of one or more specific collections					
Comment on the impact of your work as a fellow on the field of data or software curation.					

10. For each area of responsibility below, chose the statement that best describes the impact that your work as a fellow had or will have on your academic discipline or field of expertise.

	I was able (or will be able) to make a positive impact	I was able (or will be able) to make a moderate impact	I made (or will make) no impact	I don't know	I did (or do not) have this responsibility
Implementing a specific project or projects					
Conducting a needs assessment					
Planning strategies to meet identified needs					
Creating and delivering education and training (e.g., workshops, one-on-one consultations)					
Contributing to infrastructure development					
Contributing to software development, including tools					
Contributing to software implementation					
Conducting community outreach both on campus and outside the institution					
Contributing to the digitization of collections					
Contributing to the creation of metadata					
Promoting the use of one or more specific collections					
Comment on the impact of your work as a fellow on your academic discipline or field of expertise.					

11. Which of the following nontechnical, data-related activities did you perform during your fellowship? Select all that apply.

- Drafted data-related policies and plans
- Consulted on data management for project or proposals
- Taught data management, analysis and/or use courses/workshops
- Developed community outreach programs incorporating data/digital collections/services
- Collaborated with academic departments on data-related activities
- None of the above

Describe other data-related activities you performed.

12. Choose the statement that best describes the impact of the CLIR Postdoctoral Fellowship Program on your fellowship experience.

	Aspect was critical to my success	Aspect had a positive impact on my success	Aspect had no impact on my success	Aspect had a negative impact on my success	Aspect was a waste of time	I didn't experience this aspect	I don't know	N/A
Attending the summer seminar								
Attending mid-fellowship meetings (CNI Meeting/DLF Forum)								
Attending online sessions for fellows								
Interacting with my supervisor								
Interacting with fellows and former fellows								
Interacting with program staff and faculty								
Leading or participating in a 'microgrant' project								
Participating in one or more inquiry groups (2017-2020 fellows)								
Participating in one or more of the collaborative writing projects								

Provide comments on the impact of the above CLIR program components on your experience.

13. Which of the following technical skills or experiences did you acquire during your fellowship? Select all that apply.

- Library skills, such as cataloging, collection development, working with research databases or integrated library systems
- Website development, including web design, creating online exhibits
- Data modeling and management skill development, including database design, data ingest, etc.
- Programming skills, including coding or scripting languages, version control
- Data analysis, visualization or data manipulation
- Creation of digital special collections/archives
- Creation of metadata, including working with metadata standards, harvesting metadata
- Digital preservation skills, including verification of data integrity, migration of data to newer formats
- None of the above

Describe other technical skills you acquired as a fellow.

14. Recent fellows and supervisors interviewed by our assessment team have identified several challenges that inhibited the success of fellows. We would like to get a sense of the impact of those factors on the fellows over time. Thinking about your experience, how challenging do you think the following situations were for you?

	Very challenging	Somewhat challenging	Neutral	Not very challenging	Not at all challenging	I don't know	N/A
Working within the limitations of a contingent worker							
Being relatively isolated as I undertook my project							
Working on a project with limited support							
Lack of training from CLIR to support my fellowship							
Lack of training from my host institution to support my fellowship							

Lack of training from CLIR for career development							
Lack of support or resources from my host institution for my work							
Earning the trust of co-workers							
Share comments related to above statements:							

16. Indicate your level of agreement with the following statements about CLIR.						
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I don't know
The Postdoctoral Fellowship Program has made a positive difference in my career.						
The Postdoctoral Fellowship Program has made a positive difference in the practices of host institutions.						
The fellows' alumni network is a valuable resource for building my career.						
The fellows' alumni network offers unexpected career opportunities.						
I am in regular contact with colleagues I met through my CLIR Postdoctoral Fellowship.						
Share any additional comments related to the impact of the CLIR Postdoctoral Program.						

17. Rank the following kinds of support and activities that the CLIR Postdoctoral Fellowship Program could provide to alumni in the next five years in priority order, with 1 being the top priority and 10 being the lowest priority.

- ___ Clarify the program's vision and mission
- ___ Host more online social/networking opportunities for the fellowship community
- ___ Host online technical skill-building opportunities (e.g., programming) for the fellowship community
- ___ Host online interpersonal skill-building opportunities (e.g., job interviewing) for the fellowship community

- ___ Increase management and leadership development opportunities for fellowship supervisors
- ___ Provide a clearinghouse of information about alumni and their work
- ___ Provide a clearinghouse of professional development content created for fellows and others
- ___ Provide financial resources and guidance for organizing networking opportunities
- ___ Provide more structure for members of the fellowship community undertaking program-sponsored projects

18. In 10 or fewer words, what do you believe is the most significant impact of the CLIR Postdoctoral Fellowship Program?

Conclusion and Thank You

Thank you for taking the time to contribute your impressions of the CLIR Postdoctoral Fellowships in Data and Software Curation. The information you've shared will help CLIR's evaluation team members to contextualize their current findings and to refine the recommendations they will make in a report to be published by CLIR.

Appendix E

Survey for Current and Former Data and Software Curation Fellowship Supervisors, 2021

Welcome and Introduction

The Council on Library and Information Resources received funding from The Andrew W. Mellon Foundation for a program that included a survey of current and former supervisors of all data and software curation fellows who started fellowships from 2012 to 2019. CLIR has contracted with independent consultants, Liz Bishoff of The Bishoff Group and Tom Clareson of Lyris, to conduct this survey.

This survey will collect information about:

- the host institution's experiences with CLIR Postdoctoral Fellows
- the impact of the data and software curation fellows on the host institution
- recommendations for future Postdoctoral Fellowship Program activities.

Your responses will not be viewed by anyone except the consultants, who will aggregate information prior to sharing with the CLIR, to assure anonymity.

Your fellow/s may have engaged with others in your institution. You may need to connect with these colleagues to gather input for this survey. We request that only ONE survey be returned from each institution. We are attaching a PDF version of the survey so that you can share it with others in your institution for their review.

The survey will take approximately 20 minutes to complete. You may enter and exit the survey at any time. There is an icon in the upper-right-hand corner of the screen that you can use to exit the survey. To exit/reenter, you will need to enable cookies on your browser, as this is the way Survey Monkey tracks the respondents. Additionally you will need to use the same browser and the same device to complete the survey.

Please remember to click the 'DONE' button at the end of the survey to save your input. Once you have submitted your results, you will not be able to go back to the survey to change or update your answers.

Sincerely,

Christa Williford
Senior Director, Research and Assessment

Demographic Information

*** 1. How many CLIR postdoctoral fellows has your organization hosted? Select only one answer.**

- 1
- 2
- more than 2

*** 2. In what year(s) did your fellow(s) begin their fellowship(s)? Select all that apply.**

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- I don't remember.

*** 3. Which of the following types of fellowships did you or do you supervise? Select all that apply.**

- Data Curation for African American and African Studies
- Data Curation for Early Modern Studies
- Data Curation for Energy Economics or Energy Social Science
- Data Curation for Latin American and Caribbean Studies
- Data Curation for Medieval Studies
- Data Curation for the Sciences and Social Sciences
- Data Curation for Visual Studies
- Software Curation
- I don't remember

*** 4. Choose the option that best describes your current or most recent job. Select only one.**

- Position in an academic library
- Position as academic faculty
- Position at an academic institution that is neither faculty nor library appointment
- Position at a government agency
- Position in a museum or other cultural heritage organization
- Position in a nonprofit organization
- Position in private industry
- Self-employed
- Other (please specify)

Host Experience

The questions in this section have been designed to accommodate a variety of circumstances. If the fellow you are currently supervising remains in the fellowship, respond based on your experience to date. If the fellow you supervised departed the fellowship early and did not complete it, or if you have supervised the fellow for only part of the fellowship, answer the questions in this section on the basis of your experience with the fellow and add clarifying comments, noting these factors if they are relevant to your response. If you supervised more than one fellow in data or software curation who began the fellowship from 2012 to 2019, answer the questions thinking only of your most recent experience as a supervisor of one of those fellows.

5. Choose the option(s) that describes the host institution's goals in having a CLIR fellow in data or software curation. Select all that apply.

- Implementing a specific project or projects
- Conducting a needs assessment
- Planning strategies to meet identified needs
- Creating and delivering education and training (e.g., workshops, one-on-one consultations)
- Developing infrastructure (e.g., institutional repository, data curation policies)
- Developing or implementing software
- Conducting community outreach on campus and/or outside the institution
- Promoting the use of specific collection(s)
- Digitizing materials
- Creating metadata

Share other goals the host institution had for the CLIR fellow.

6. Were the host institution's goals met? Select one.

- Yes
- No
- Partially

If no or partially, explain why the goals weren't met or were partially met.

7. What have been the critical successes of the fellowship? If you hosted more than one fellow, consider only your most recent fellow. Select all that apply.

- Fellow created or expanded the institution's or department's community outreach program.
- Fellow helped build new collaborative partnerships.
- Fellow raised awareness of the importance of data management among the institution's researchers and students.
- Fellow raised awareness of the importance of devoting institutional resources to data curation.
- Fellow was a needed change agent in the institution.

- Fellowship changed colleagues' perspectives on the value that recent PhDs bring to the work of the unit.
- Fellowship made it possible to implement a specific project or projects.
- None of the above.

Share additional comments related to critical successes.

8. Recent fellows and supervisors interviewed by our assessment team have identified several challenges that inhibited the success of their fellowships. We would like to get a sense of the impact of those factors on the fellows over time. Thinking about the most recent data or software curation fellow you supervised, how challenging do you think the following situations were for the fellow?

	Very challenging	Somewhat challenging	Not at all challenging	I don't know	N/A
Working within the limitations of the fellow's contingent status					
The fellow's isolation as they undertook their project(s)					
Lack of training from CLIR to support the fellow					
Lack of training from the host institution to support the fellow					
Lack of support or resources from the host institution for the fellow's work					
Navigating institutional bureaucracy					
Add any further comments about these or other challenges you saw your fellow facing during the fellowship.					

9. What type/s of educational and career development support did the host institution provide the fellow? Select all that apply.

- Career development support; e.g., résumé development
- Mentorship from a colleague other than the supervisor(s)
- Time to take courses related to fellowship
- Time to work on publication(s) related to fellowship or research interest
- Training in project management
- Training on metadata creation or other kinds of description for digital materials
- Training to use software needed for their work
- Other training related to data curation
- No specific training, the fellow learned on their own
- I don't remember
- I don't know

Please add further comments related to the host institution's support of the fellow.

10. From your observations, what opportunities did the fellowship provide the fellow to demonstrate their skills and knowledge in the following areas?

	Was an expert prior to fellowship	Gained expert understanding and worked independently	Gained advanced understanding and worked with limited guidance	Gained intermediate understanding, worked with some guidance	Gained basic knowledge, couldn't work independently	N/A
Creating digital collections						
Creating metadata						
Data analysis, visualization, manipulation, etc.						
Data modeling and management skills; e.g., database design, data ingest, etc						
Digital preservation; e.g., creating disk images, verifying data, migrating data						
Programming skills; e.g., coding or scripting language, version control						
Website development; e.g., web design, creating online exhibits						
Add any further comments related to the fellow's knowledge/skills development.						

11. Was your institution able to hire the data or software curation fellow at the end of the fellowship? Consider only your most recent fellow. Select one.

- Yes
- No, at the time, we did not have an open position
- No, we needed the fellow only for the duration of the fellowship
- No, we offered the fellow a position, but they turned it down
- No, the fellow wasn't suitable for a permanent position
- I don't remember

Provide additional information regarding the host institution's ability to hire the fellow.

12. Based on your experience, what could the host institution have done to better prepare to host the fellow?

13. To your knowledge, has the host institution implemented any permanent changes because of the CLIR fellowship? Select all that apply.

- The institution maintains a project(s) the fellow created or advanced.
- The institution changed its data curation practice to address needs identified or recommendations made by the fellow.
- The institution continues to offer courses, education, and training opportunities developed by the fellow.
- The institution maintains a data storage solution developed or advanced by the fellow.
- The institution maintains software tool(s) or service(s) developed or implemented by the fellow.
- The institution maintains a community outreach program(s) or collaborative partnership developed or advanced by the fellow.
- The institution maintains a digital collection created and/or curated by the fellow.
- The institution didn't implement any changes because of the fellowship.

Provide additional information regarding the impact of the fellow's work on the host institution's data or software curation efforts.

14. Indicate your level of agreement with the following statements.						
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I don't know
The fellowship program was an opportunity to introduce new types of staff into the host institution						
The fellow brought a researcher's perspective to the host institution						
The fellow served as a change agent at the host institution						

The host institution's data curation or data management program was advanced because of the fellowship						
The host institution maintains a community outreach program(s) developed or advanced by the fellow						
The host institution maintains a collaborative partnership developed or advanced by the fellow						
Two years is sufficient time to provide a meaningful career development experience for a recent PhD						
My current institution would be willing to participate in a three-year fellowship program						
My current institution would be interested in hosting a fellow in the future						
Provide additional comments regarding the impact of the fellow on the host institution.						

Experience with CLIR

This section is designed to collect your impressions and opinions about CLIR and the future of the Postdoctoral Fellowship Program. As you answer these questions, think about your experience with CLIR and CLIR's Postdoctoral Fellowship Program in its entirety.

15. Indicate your level of agreement with the following statements about the host institution's experience with CLIR postdoctoral fellowship program.						
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I don't know
CLIR's programs are relevant to my institution's work						
CLIR's programs are unique among professional organizations						
Being part of a CLIR fellows cohort was a valuable experience for the fellow(s) I supervised						
CLIR provided an appropriate level of guidance and support to help the institution host a successful fellowship						

Communication with CLIR about the fellowship program was timely						
Communication with CLIR about the fellowship program was timely						
The CLIR postdoctoral fellowship program has made a positive difference for the host institution						
The CLIR postdoctoral fellowship program is making a positive difference in the field of data curation						
Share additional comments about the benefits of CLIR's programs or CLIR's postdoctoral fellowship program for host institutions.						

16. Rank in priority order the following kinds of support and activities that you think CLIR could provide host institutions and supervisors in the next five years, with 1 being the top priority and 8 being the lowest priority.

- ___ Clarification of the postdoctoral fellowship program's vision and mission
- ___ Clearinghouse of professional development content for fellows so others can reuse it within and outside the fellowship community
- ___ Clearinghouse of information about past and current fellowship projects
- ___ Expand online social/networking opportunities for the fellowship community (including supervisors and former supervisors)
- ___ Increase guidance and support for host institutions developing position descriptions for future fellowships
- ___ Offer more online technical skill-building opportunities (e.g., programming or coding) for the fellowship community
- ___ Offer more online interpersonal skill-building opportunities (e.g., job interviewing) for the fellowship community
- ___ Offer more management and leadership development opportunities for fellowship supervisors

17. In 10 or fewer words, what do you believe is the most significant impact of the CLIR Postdoctoral Fellowships in Data and Software Curation Program?

Thank you

Thank you for taking the time to contribute your impressions of the CLIR postdoctoral fellowships in data and software curation. The information you've shared will help CLIR's evaluation team members to contextualize their current findings and to refine the recommendations they will make in a report to be published by CLIR.

Appendix F

Focus Group Discussion Guide for Current and Former Fellows

1. Introductory information
 - Introductions: participants and facilitators
 - Agenda review
 - Background information on purpose of focus groups
 - Objectives
 - Obtain feedback from fellows regarding their experiences
 - Obtain recommendations regarding future CLIR Postdoctoral Fellowship activities
 - Process Agreement
2. Brief introduction of focus group participants describing fellowship—two or three sentences.
3. From your perspective, what do you see as the most successful aspect of your fellowship? What area most needed improvement?
4. In the survey, fellows gave mixed responses regarding the overall impact of their fellowship on the host institution. What might you suggest to CLIR, host institutions, and future fellows to realize greater impact?
5. Some of the fellowships are very specific and structured, while others offer fellows a great deal of autonomy and choice in the projects they pursue. In the survey, several fellows made observations about the benefits and drawbacks of having clearly defined projects versus having choices. Based on your experience of how your responsibilities were defined, what do you see as the benefits and challenges of each approach, and what recommendations do you have for CLIR and host institutions in defining fellowship roles and responsibilities?
6. In most host institutions, fellows are contingent workers. From this position, fitting into the organizational culture can present challenges. If you experienced this situation, what strategies have you or your host institution used to improve your success? What strategies would you suggest to other host institutions and fellows to address this situation?
7. Some fellows left their positions early; others stayed the full two years. Based on your own experience, share your thoughts on the length of the fellowship. How would you compare the benefits and challenges of a two-year fellowship with those of a three-year or longer fellowship?
8. Which aspects of the fellowship program had the greatest impact on your development, and why?
9. COVID-19 continues to affect the way individuals and organizations function. If you were a fellow during the pandemic, what changes did your organization make to support your work, and how effectively did you, and your colleagues, adapt? Do you have any advice for how CLIR and host institutions could better prepare for working remotely or for dealing with future disruptions?

10. CLIR is exploring opportunities that they could offer to alumni of the Postdoctoral Fellowship Program in the future. CLIR would like assistance in prioritizing these opportunities. What kinds of activities would be most meaningful to you: informal networking within the alumni community, learning activities (leadership development, skills development, etc.), teaching and/or presenting, writing or publishing, opportunities to collaborate on projects, or something else?
11. What else would you like to share with us today that you haven't already had an opportunity to say?

Appendix G

Focus Group Discussion Guide for Current and Former Supervisors

1. Introductory information
 - Introductions: participants and facilitators
 - Agenda review
 - Background information on purpose of focus groups
 - Objectives
 - Obtain feedback from host institution supervisors regarding their experiences with the program
 - Obtain recommendations regarding future CLIR postdoctoral fellowship activities
 - Process Agreement
2. Brief introduction of participants describing host institution fellowship program—two or three sentences.
3. From your perspective as a host institution supervisor, what was the most successful aspect of the fellowship you supervised? What area most needed improvement?
4. In the survey, fellows gave mixed responses regarding the overall impact of their fellowship on the host institution. What might you suggest to CLIR, host institutions, and future fellows to realize greater impact?
5. Some of the fellowships are very specific and structured, while others offer fellows a great deal of autonomy and choice in the projects they pursue. In the survey, several fellows made observations about the benefits and drawbacks of having clearly defined projects versus having choices. Based on your experience of how your fellow's responsibilities were defined, what do you see as the benefits and challenges of each approach, and what recommendations do you have for CLIR and host institutions in defining fellowship roles and responsibilities? If the fellowship were three or four years long instead of two, how should CLIR and host institutions adjust their approach?
6. In most host institutions, fellows are contingent workers. From this position, fitting into the organizational culture can present challenges for the fellow. If your fellow experienced this situation, what strategies have you or your host institution used to improve success? What strategies would you suggest to other host institutions and fellows to address this situation?
7. COVID-19 is affecting the way individuals and organizations function. If you had a fellow during the pandemic, what changes did your organization make related to how you worked with your fellow? If you didn't have a fellow but might have one in the future, how would your experience of the past year inform your priorities for the fellowship?
8. Some fellows left their positions early; others stayed the full two years. Based on your own experience, share your thoughts on the ideal length of a fellowship. How would you compare the benefits and challenges of a two-year fellowship with those of a three-year or longer fellowship?
9. CLIR is exploring opportunities that they could offer supervisors in the future. CLIR would like

assistance in prioritizing these opportunities. What kinds of activities would be most meaningful to you: informal networking within the fellowship community, learning activities (leadership development, skills development, etc.), teaching and/or presenting, writing or publishing, opportunities to collaborate on projects, or something else?

10. What else would you like to share with us today that you haven't already had an opportunity to say?