Library as Research Lab: Immersive Research Education and Engagement for LIS Students and Library Professionals

This project aligns with IMLS's strategic goal of libraries as community anchors infusing academic libraries with research laboratories to enhance the research skills of professional librarians and master's students. The project runs from October 1, 2017 to September 30, 2020. The University of Michigan Library will serve as the site of the research labs, and University of Michigan School of Information faculty and librarians will co-create research and learning environments in which cohorts of LIS students will engage in a variety of research projects over the course of an academic year. Each lab will consist of seven members: a director, a senior librarian, a junior librarian, and four students. Students will be mentored by faculty, practicing librarians, and peers; junior librarians will be mentored by the faculty and senior librarians. Students will have the opportunity to apply what they learn from coursework in such areas as project management, contextual inquiry, research methods, and statistical analysis to library- practices. The three research labs will be: Library Assessment in Student Learning, Library Assessment for Research and Scholarship, and Designing Thinking for Services.

The importance of gaining practical experience as a co-curricular program has long been recognized in LIS education. Through internships, practicums, or field experiences, LIS students are expected to perform a range of tasks in library work settings. However, programs tend to focus on traditional library functions and do not often provide the opportunity to engage in the kinds of professional practice that would support the new set of competencies and capabilities that LIS graduates need in order to succeed in the workforce. Likewise, new library practitioners have not had the opportunity to engage in research or evidence-based practice. Academic librarians are increasingly expected to use evidence to justify the status of the library as a community anchor contributing to the overall teaching, research, and service missions of the university. As a result, recent LIS graduates and current librarians alike must develop the research skills needed to demonstrate the library's value by using evidence and to build an argument when proposing new and novel programs and services.

Over the three years of project, 30 students and six librarians will participate in the program. Students will submit their applications, and lab directors and librarians will make selections, assigning students to one of the three research labs. At the beginning of each year of the program, librarians will attend a half-day mentoring workshop. Based on the materials developed for the workshop, discussions, and ideas generated during the mentoring workshop, lab directors will revise the program's published *Mentoring Handbook* and make it publicly accessible. The members of each lab will meet bi-weekly to share research ideas, work on research design, analyze data, implement solutions, and report results. The entire cohort of students, librarians, and lab directors will participate in monthly research seminars to learn responsible conduct of research and scholarship, including the topics such as research integrity, ethics, IRB (Institutional Review Board) application procedures, academic writing, grant writing, data management, poster presentation, and publication venues. Students will benefit from peer-to-peer mentoring, and librarians will benefit from sharing mentoring experiences in the monthly research seminar. At the end of each year participants will present their research projects in an annual research symposium, which will be open to the University of Michigan community. Students and librarians will be expected to present their projects in professional conferences or to publish in professional journals.

The success of the project will be evaluated in terms of process and outcomes. The process-based evaluation will assess how well project activities are being implemented based on the data collected from observation of events, document review, pre- and post- program questionnaires, and exit interviews. These will be used to inform future iterations of the project as well as the end products, such as the mentoring handbook. The outcome-based evaluation will assess learning outcomes for students and professional-development outcomes for librarians. Pre- and post-program questionnaires, individual exit interviews, and focus-group interviews will be collected and analyzed to assess the self-confidence, research skills, and critical-thinking skills of the students and the mentoring skills, research skills, and professional identity of the librarians.

The impact that the proposed project will make to the LIS field include: (1) the creation of a replicable *Library as Research Lab* model; (2) building research skills and professional capabilities in the academic library workforce; (3) fostering and enhancing mentoring capabilities in the profession. Ultimately, LIS educators, LIS students, and academic librarians who are seeking alternative practical experience programs will be beneficiaries of the proposed project because they will be able to replicate and adapt our research lab model.

Library as Research Lab: Immersive Research Education and Engagement for LIS Students and Library Professionals

This project aligns with IMLS's strategic goal of advancing the role of libraries as *community anchors* by reconfiguring libraries as research laboratories to enhance the skills of professional librarians and master's students. The project runs from October 1, 2017 to September 30, 2020. The University of Michigan School of Information (UMSI) and the U-M Library will collaboratively coordinate the project. U-M Library will serve as the site of the research labs, and UMSI faculty and librarians will co-create and manage the research and learning environments in which students will perform empirical and analytic research projects over the course of an academic year. We propose creating three interconnected research labs to engage in activities focused on three research themes: assessing the library's role in student learning; its impact on research and scholarship; and redesigning library services to accommodate changes in higher education. Each lab will include seven participants: one lab director, one senior librarian, one junior librarian, and four master's students per year. The program's three lab directors will be the PI and two Co-PIs. Over the three year project period, 30 students (6 students in Year 1 and 12 students in Years 2 and 3) and six librarians will participate in the program. By receiving guidance and mentoring for eight months over two semesters, students will have the opportunity to apply coursework in such areas as library assessment, contextual inquiry, research methods, and statistical analysis to library-work practices. Likewise, their research lab work will enrich the classroom experience for them and their classmates. The yearlong program will also allow librarians and students to engage in a full cycle of research projects, encompassing all aspects of the research experience. Based on empirical evidence from the evaluation study, we intend to demonstrate that this model can be applied and adopted in LIS programs and academic libraries beyond the University of Michigan.

1. Statement of Need

The motivation for this project is rooted in ongoing efforts and discussions about a new set of core competencies for librarians. One important problem widely noted by both practitioners and educators is that the current curriculum often produces "universal librarians" (Institute of Museum and Library Services, 2015, p.11), who are no longer effective in preparing students to achieve depth in core competences. Deanna Marcum (2015) pointed out that "the enormous changes occurring in research libraries are not matched by the pace of change in library program curricula" (p. 4) and that core courses required for LIS students do not keep up with the needs of the workforce. Recently, IMLS funded efforts to identify a new set of competencies and capabilities for LIS graduates: one such initiative was the 2015 conference "Envisioning our Information Future and How to Educate for it" which brought together a diverse group of stakeholders to discuss the roles of LIS graduates and the knowledge, skills, and abilities associated with those roles (Ables, Smith, & Howarth, 2015). The University of Maryland Report, "Re-Envisioning the MLS" (Bertot, Sarin, & Percell, 2015) concluded that new librarian core competencies should include the ability to lead and manage projects and people, the ability to think and adapt instantaneously, and the ability to solve complex problems.

This problem – the gap between what is taught in LIS classrooms and what skills and abilities are needed for information professionals in the contemporary workplace – is not new. LIS programs have long dealt with this gap by offering opportunities for practical experience such as internships, practicum, field experiences, experiential learning, and service learning (Berg, Hoffmann, & Dawson, 2010). Although the formats, lengths, and components of these learning opportunities vary, they share a commitment to a critical component of LIS education.

In most LIS programs, students are expected to perform a range of library tasks through various practical engagements in both curricular and co-curricular settings. Yet most internships focus almost exclusively on library functions; if there is a research component, it is often unsupported. This type of research does not prepare students to be evidence-based practitioners. Likewise, new library practitioners often focus on library functions and do not have the opportunity to engage in research or evidence-based practice.

There are three distinct features in our model. First, this program will establish research labs in an academic library. Each lab will consist of seven members: a director, one senior librarian, one junior librarian, and four

students. Students will be mentored by faculty, research librarians, and peers; junior librarians will be mentored by the faculty and senior librarians. In this model, we hope to address the lack of mentoring that students report as being a disappointing element of their internship programs (Sargent, Becker, & Klingberg, 2011), as well as the related reluctance of librarians to invest in mentoring students because of the perception that students do not remain long enough to merit such an investment (Sweetman, 2007). In our multidirectional mentoring with sustained interactions through a lab-based experience, librarians will engage in their own professional development and continuing education by working collaboratively on research projects, and students will have rich mentor and collegial interactions with faculty, librarians, and peers.

Second, this project focuses on improving students' and librarians' research competencies and will develop better evidence-based practitioners. Academic librarians are increasingly expected to use evidence to demonstrate library impact and value (Oakleaf, 2013) in order to justify their status as a community anchor contributing to the overall teaching, research, and service missions of their university. As a result, recent LIS graduates and current librarians alike need to develop the research skills (Connaway & Radford, 2016) needed to be able to demonstrate systematic evidence for data collection, analysis, and interpretation to use that evidence in order to build an argument when proposing new and novel programs and services.

Third, students will have opportunities to apply what they learn from coursework such as library assessment, contextual inquiry, research methods, and statistical analysis to library work practices through guidance and mentoring for eight months. Likewise, their research lab work will enrich the classroom for all students. The academic year-long engagement for each cohort will allow librarians and students to engage in a full cycle of research projects from searching for related literature, defining research questions, data collection, data analysis, interpretation, writing, speaking, and managing projects.

The program proposed here provides three core components: 1) an experiential research-based learning opportunity to complement and enrich classroom instruction for LIS students; 2) a professional development program for junior librarians; and 3) an opportunity to use and improve mentoring skills for senior librarians. The promise of nurturing mutually beneficial relationships among lab directors, librarians, and students is a powerful strategy for building the necessary skills and competencies for the workplace.

2. Project Design

2.1. Goals and Objectives

The long-term goal of a proposed model is to strengthen the research skills of current and future librarians through research experiences in a research lab environment. The purpose of this project is to demonstrate how to build a new learning community in which research skills, professional practice, and mentoring are shared through activities in multiple research labs directed by LIS educators and academic library administrators collaboratively. The proposed model will enable us to develop, evaluate, improve, and iterate an infrastructure in which students and librarians can enhance their work performance capabilities.

Specifically, it is intended to benefit both LIS students and library practitioners by achieving the following objectives: (1) Participating students (N=30) will be able to apply what they have learned in their research-related courses in lab activities, and use their research experiences in the research lab in their coursework. Although most LIS programs offer a range of research methods courses in the curriculum, simply taking courses may not be enough for students to be able to conceptualize and implement a new research project when they enter the workforce. This program will enable students to engage in the research process collaboratively working with a group of lab members. As a result, they are not only able to learn research methods but also other skills in project management, communication, writing, and critical thinking.

Participating librarians (N=6) will be able to improve their problem-solving and analytical thinking skills by engaging in the research process. This will help them to become evidence-based practitioners. This program will give them opportunities to keep up with new trends and issues by interacting with a larger community beyond their routine work tasks. They will receive formal training in mentoring skills and strategies, and will have opportunities to apply such skills directly to student members in the lab. As a result, they will gain

confidence in mentoring students and peers. They are more likely to share their expertise and skills in a broad professional community.

All of the lab members will have opportunities to experience innovative mentoring in the research lab that moves away from traditional one-on-one mentoring model. The project team will be able to develop research methods and tools that are proven to be useful to assess the effectiveness of the new mentoring model, and both instruments and findings will be shared widely among library practitioners and LIS educators.

2.2. Project Activities

Activity 1: Recruitment and Selection of Students for Three Research Labs

Students participating in the program are called LARL (Library as Research Lab) Fellows and they are responsible for scheduling their own research hours around their academic schedule. We will announce the LARL Fellows Program in September 2017 (See Appendix – Service Expectation and Recruitment).

The 2017-2018 academic year will be a pilot year. There will be no specific prerequisites in the application, but their coursework will be considered for selecting students. Students will submit the applications to the LARL program, not to a specific research lab in October 2017 and will be notified of the decision in November 2017. With input on the review rubric from the advisory board, the lab directors (PI and Co-PIs) and six librarians will review the application materials, make decisions, and assign the students to one of the three research labs. Accepted students will participate in the program for the Winter term only (January 2017-April 2017). Students are expected to work on an ongoing or new project assigned by librarians for 10 hours a week for 16 weeks in the 2017 Winter term (January – April). Each student will receive a $5,000 stipend.

In the 2018-2019 and 2019-2020 academic years, we will operate the full-scale program, offering the research opportunity to 12 master's students each year. For placement in the Year 2 cohort, students will apply to be a LARL Fellow in February 2018. Decisions will be made in March 2018. Students will work in one of the research labs from September 2018 until April 2019. For the Year 3 cohort, we plan to follow the same timeline although adjustments and revisions could be made based on informal feedback and the results of evaluation studies from Years 1 and 2. Students in Years 2 and 3 are expected to work on a research project for 10 hours a week over 32 weeks in total. Each student will receive $10,000 stipends.

Students who are accepted to the LARL Program will be assigned to one of the three labs based on their preferred rankings, their knowledge and skills, and fit with the research area.

The members of the *Library Assessment in Student Learning Lab* will utilize existing data or collect empirical data to assess what and how well library resources, services, and spaces contribute to student learning. This will include research activities, such as investigating correlations between student library interactions and students' academic performance, and analyzing systematic evidence to demonstrate the role of libraries in student learning perhaps combining data from library and academic systems. This lab will also examine new ways to enhance library contributions to student learning.

The *Library Assessment for Research and Scholarship Lab* members will engage in a variety of research activities that will investigate how to support research and scholarship throughout the research lifecycle. This will include everything from studies of how librarians can best provide data management plan assistance for grant proposals to investigations of long term data curation needs. This lab might also study library assessment data to develop new services to support different aspects of research and scholarship.

The *Design Thinking for Services Lab* will engage in research projects aimed at developing better services that address solutions for complex library problems. This will include applying the iterative processes of problem definition, brainstorming, researching, prototyping, and feedback to the current and future challenges of redesigning library services to meet the emerging needs of learners and scholars. This lab will develop online and physical prototypes of new services through engagement with users and library stakeholders in participatory design activities and will explore collaborative, team-based approaches to service innovation. We will also leverage the work already being done by the creators of the *Design Thinking for Libraries Toolkit* (http://designthinkingforlibraries.com/).

Activity 2: Curriculum Support for Master's Students
Master's students will be guided to take at least three research methods courses in their first year to be eligible to apply to this program: "Contextual Inquiry and Consulting Foundations" will be a required course and "Introduction to Statistics and Data Analysis" and "Research Methods for Information Professionals" will be strongly recommended ones. In their second year, we will recommend that the students enroll in the Library and Archives Assessment capstone course, to be taught by Soo Young Rieh, principal investigator (PI), or Elizabeth Yakel, co-principle investigator (Co-PI). Alternatively, students can enroll in the Master's Thesis Option Program (MTOP) and base their theses on the research project. See Appendix – Curriculum and Training Activities for course descriptions of these four courses and the MTOP.

Activity 3: Mentoring Support and Professional Development for Librarians
At the beginning each program year, the PIs will organize a half-day mentoring workshop for librarian mentors to review time commitments, roles, and responsibilities. The PIs will design standards and guidelines in advance of the project's commencement and publish an electronic *Mentoring Handbook*. This is needed because much of the literature on mentoring in higher education is aimed at either faculty or doctoral students. Mentoring literature in LIS is often geared toward shorter internships and one on one mentoring (Farmer, Stockham, & Trussell, 2009; Goodsett & Walsh, 2015; Lacy & Copeland, 2013). The policies and procedures in the handbook will focus on explaining the expectations and best practices of mentoring. During the mentoring workshop, librarians will exchange ideas about how to handle challenging mentoring situations that sometimes arise. PIs will revise the handbook once a year based on the discussions and ideas generated during the annual mentoring workshop and on the best practices identified in the monthly research seminar. The handbook will be widely disseminated and publicly accessible beyond the U-M Library communities.

Activity 4: Community Building through Bi-Weekly Research Lab Meetings and Monthly Research Seminars
Students, librarians and lab directors will meet bi-weekly in formal one-hour research lab meetings. Informal meetings between lab members will take place as needed. Each lab will have its own schedule of research-lab meetings. The lab meetings will be designed to share research ideas, to work on research design, review findings, and to report progress. Each lab will receive $5,000 over the three years, which can be used to pay for study subject fees and transcription services.

In addition to bi-weekly research-lab meetings, the entire cohort of students, librarians, and lab directors will have monthly, 90-minute research seminars. Each seminar will be composed of two parts. In the first session, PI and Co-PIs will provide hands-on instruction about responsible conduct of research and scholarship, including the topics such as research with human participants, Institutional Review Board (IRB) application procedures, conflict of interest, research integrity, ethics, plagiarism, academic writing, data management, grant writing, poster presentation, and publication venues. Additional topics and schedules are shown in Appendix – Sample Curriculum and Training Activities.

In the second session, students from each research lab will give a progress report about their research activities, provide peer-to-peer mentoring, and build a learning community. This part will be an informal gathering in which participants will be encouraged to share not only their accomplishments but also their experiences of the barriers they have encountered and the solutions they have devised to overcome them. Librarians will benefit from being able to share insights about practical implications and mentoring experiences that will provide opportunities for their professional development.

Activity 5: Presentation and Publication of Research Projects
At the end of the program, participants will present their research projects in the annual research symposium. Students will prepare academic presentations for the symposium. This symposium will be open to the University of Michigan community, with invitations to the faculty members and graduate students in the School of Information as well as librarians and administrators in the University of Michigan Libraries. The symposium

is expected to provide a forum for students, librarians, faculty, and other communities to exchange ideas about further research and future projects.

In addition to presenting at the symposium, students and librarians will be expected to present their projects at professional conferences or to publish in peer-reviewed journals. Students and librarians will learn how to write academic papers. The PIs will support such presentation and publication activities by recommending appropriate venues and providing feedback on drafts. Participating librarians could use their $2,000 stipend to defray costs for conference travel.

2.3. Outcomes and Evaluation

The evaluation design aims at providing rich evidence for this LIS education model in terms of both process and outcomes. The process-based evaluation is diagnostic in nature, having the goal of identifying the areas that have worked successfully and the ones that need improvement. The outcome-based evaluation is judgmental, with the purpose of determining whether the project achieved the intended learning outcomes for students and professional development outcomes for librarians.

(1) Process-based Evaluation

The process-based evaluation is designed to assess how a program is being implemented (New York State Health Foundation). The results will inform the program's operation in terms of the scope, frequency, and format of the Library as Research Lab project activities that can be refined and implemented in subsequent years. Table 1 presents an initial set of categories and measures to be tested in the program, which will be revised in Year 2 and Year 3.

Table 1: Process-based evaluation measures and data sources

Participant	Assessment Category	Measure	Data Source
Students	Satisfaction with project activities	- Topic of research project - Being Mentored - Timing and frequency of activities - Preparedness in coursework	- Pre-post program questionnaires - Exit interview
	Barriers	- Challenges experienced by participants - Lessons learned for future activities - Discrepancies between expectation and actual experience	- Pre-post program questionnaires - Exit interview - Observation of events - Document review
Research Labs	Project implementation	- Quality of activities implementation - Effectiveness of lab management - Attendance rate - Frequency of interaction among lab members	- Pre-post program questionnaires - Exit interview - Observation of events - Document review - Participation rates
Librarians	Satisfaction with project activities	- Interactions with peer librarians - Mentoring - Value for professional development - Time spent	- Pre-post program questionnaires - Exit interview
	Barriers	- Challenges experienced by participants - Balance between regular work tasks and the project - Ability to make project changes midstream	- Pre-post program questionnaires - Exit interview - Observation of events - Document review

(2) Outcome-based Evaluation

The outcome-based evaluation will investigate the changes resulting from project activities focusing on "how our program has made a difference" and "how the lives of the program participants are better as a result of our program" (Institute of Museum and Library Services, 2006, p. 2). Table 2 presents specific assessment categories, questions, and measures to assess the effectiveness of this project. Outcome-based evaluation

focuses on assessing outcomes in terms of participants' awareness, knowledge, and skills rather than collecting outputs (e.g., number of papers and presentations, number of meetings held, etc.). We will be cautious in making any causal claims about this project. It is implemented in complex real world settings where there are many different variables that may impact students' learning and librarians' mentoring experiences.

Table 2: Outcome-based evaluation measures and data sources

Participant	Assessment Category	Measure	Data Source
Students	Self-confidence	- Confidence in managing a project - In career directions - Confidence in preparation for becoming professional librarians	- Pre-post program questionnaires - Exit interview
	Research skills	- Analytical thinking - Problem-solving approach - Competency in research methods	- Pre-post program questionnaires - Exit interview
	Critical thinking skills	- Ability to evaluate evidence - Ability to distinguish claims - Ability to break down complex problems for investigation - Ability to synthesize findings	- Pre-post program questionnaires - Exit interview
Research Labs	Research activities	- Quality of papers, posters, presentations - Paper acceptance to professional conferences and journals - Continuance of collaboration post-grant	- Compilation of papers and presentations in project website - Feedback from Symposium participants
Librarians	Mentoring skills	- Self-confidence in mentoring - Increased motivation for mentoring - Willingness to share expertise in professional community	- Pre-post program questionnaires - Exit interview
	Research skills	- Analytical thinking - Problem-solving approach - Competency in research methods	- Pre-post program questionnaires - Exit interview
	Professional identity	- More reflective practice - Job satisfaction - Occupational commitment	- Pre-post program questionnaires - Exit interview

2.4. Project Resources

Soo Young Rieh, Ph.D. (principal investigator) is the director of the Master of Science in Information (MSI) Program in the School of Information where she has been on the faculty since 2002. Her capstone course, Library and Archives Assessment, will be one of the highly recommended courses for LARL Fellows. She will be also able to supervise students who will choose to write thesis based on their research project. Rieh will lead all aspects of the project taking responsibilities, including student recruitment, organizing Monthly Research Seminars and Annual Symposium, chairing the Advisory Board Meetings, and conducting the evaluation studies of the program. She will be a director of the Library Assessment in Student Learning Lab, and will organize Bi-Weekly Research Lab Meetings. Elaine L. Westbrooks (co-principal investigator) is the Associate University Librarian for Research at the University of Michigan. Since 2013, Westbrooks has led and managed the short and long-term objectives for U-M Library's support of the research enterprise. She provides operational leadership to subject specialists who represent the Arts and Humanities, Social Sciences, International Studies, Copyright, and Science and Engineering. Westbrooks will be responsible for liaising and

communicating with librarian mentors, conducting the half-day mentoring workshops, coordinating the production and completion of the *Mentoring Handbook*, and supporting librarians' presentation and publication activities. She will be a director of the Design Thinking for Services Lab, and will organize Bi-Weekly Research Lab Meetings. Co-PI Elizabeth Yakel, Ph.D.(co-principal investigator) is Professor and Associate Dean for Academic Affairs at UMSI. Her research interests include digital archives and digital preservation, particularly as this relates to enhancing the user experience. She has pioneered the development of standardized metrics for archives and special collections and is currently engaged in investigations of research data curation and reuse. Yakel will be responsible for establishing selection criteria for student participants, working with Office of Student Affairs to recruit students with diversity background, and promoting the project inside and outside of UMSI. She will be a director of the Library Assessment for Research and Scholarship Lab, and will organize Bi-Weekly Research Lab Meetings.

The Advisory Board includes four experts in the fields of academic libraries, library assessment, and research methods for information professionals. The primary role of the Board will be to review and provide recommendations on the project's evaluation research design, methods, measures, and data collection instruments. The Board members will also provide ongoing feedback about the progress of the project, including reviewing student recruitment materials, student application selection criteria, and various project activities. The communications with the Board members will be done through the combinations of regular Board Meetings, emails, and informal gatherings in professional conferences, such as ACRL, ALISE, iSchool, and Library Assessment. The Board members are expected to attend the Board meetings 2-3 times a year, including the face-to-face meeting in Ann Arbor, Michigan in Year 1. Sue Baughman is Deputy Executive Director of Association of Research Libraries (ARL). She is an expert in developing, promoting, facilitating various policies and programs in research libraries. Her main contributions will be on evaluating the program, focusing on librarians' professional development and continuing education components. Lynn Connaway, Ph.D. is Senior Research Scientist and Director of User Research at OCLC. Connaway will provide her expertise in investigating how participating students and librarians achieve competencies in research skills and what other educational benefits they gain from the project. Christian Dupont, Ph.D. is John J. Burns Librarian and associate university librarian for special collections at Boston College. His expertise in library measurement and assessment will contribute to individual research projects and all the labs can draw on his research skills. Megan Oakleaf, Ph.D. is Associate Professor in the School of Information Studies at Syracuse University. Her expertise will be valuable in developing the impactful educational model, focusing on connecting students' LIS coursework, research experiences, and evidence-based practice.

The Team include six librarians from the University of Michigan Library. Laurie Alexander (Associate University Librarian for Learning and Teaching), Alexa L. Pearce (Head of Social Sciences Team), Meghan Sitar (Director of Connected Scholarship) will serve as senior librarian mentors. Alix Keener (Digital Scholarship Librarian), Amy Neeser (Research Data Curation Librarian), Justin Schell (Director of Shapiro Design Lab) will serve as junior librarians.

Additional team members will include one graduate student who will be hired from May to August 2019 to assist PI Rieh in analyzing the responses from pre-and post- program evaluation questionnaires and conducting exit interviews and focus group interviews with participants. Another graduate student team member will be a web designer who will design and develop the project website and the community blog site. The web designer will also develop the site where assessment materials, mentoring guidelines, descriptions of research projects, publications, reports, and presentation materials will reside. This site will also have a feature of community blog where participating librarians, students, and lab directors can present their research activities and reflective practices. The team will include staff from the UMSI who will provide administrative support to promote and recruit students and librarians and host the annual symposium.

The project will begin on October 1, 2017 and end on September 30, 2020, keeping the schedule presented in Table 3.

Table 3: Timeline of project activities

Project Period	Project Activities
Oct. – Dec. 2017	Year 1 LARL Fellow applications are open; 1st Mentoring Workshop for librarians; Selection of 6 students
Jan. - Apr. 2018	Six students start working in the research labs; Year 2 LARL Fellow applications are open; Selection of 12 students for Year 2 cohort; Students work 10 hours per week and participate in project activities
May – Aug. 2018	Co-author papers to submit a journal or conference; Evaluation of Year 1 Program; 2nd Mentoring Workshop for librarians
Sept. – Dec. 2018	12 students start working in the research labs; Students work 10 hours per week and participate in project activities
Jan. – Apr. 2019	12 students continue to work in the research labs; Students work 10 hours per week and participate in project activities; Year 3 LARL Fellow applications are open; Selection of 12 students
May – Aug. 2019	Co-author papers to submit a journal or conference; Evaluation of Year 2 Program; Publish and present the evaluation research results; 3rd Mentoring Workshop for librarians
Sept. – Dec. 2019	12 students start working in the research labs; Students work 10 hours per week and participate in project activities
Jan. – Apr. 2020	12 students continue to work in the research labs; Students work 10 hours per week and participate in project activities
May – Sept. 2020	Co-author papers to submit a journal or conference; Evaluation of the whole Program; Publish and present the evaluation research results; Publishing Mentoring Handbook

The budget covers the research funds for each lab, stipends for students, travel funds for librarians and Co-PIs, and salaries and fringe benefits for a temporary graduate student in the summer of Year 2 (four months only) for program evaluation. It also covers research assistant support to develop the project website, administrative staff support, production of the handbook, and the efforts of the PI and the Co-PI (although the PI's time will be funded in terms of a summer month, the PIs will work on the project year-round).

2.5. Communication Plan

Our communication plan is to target researchers, faculty, students, and librarians in U.S. and Canadian iSchools, LIS programs, and academic libraries. To reach them, we will raise awareness, demonstrate the value of the project, disseminate the findings, as well as the result of the assessments that we undertake. The venues for dissemination will be a variety of professional conferences, including Annual and Midwinter American Library Association (ALA), the Library Assessment Conference, the International Evidence-based Library and Information Practice Conference (EBLIP), the Association for Library and Information Science Education (ALISE), the Association for College and Research Libraries (ACRL), the Design Thinking Conference, and the iSchool Conference. In addition, we are committed to doing webinars through the Digital Library Federation, Association of Research Libraries, ALA, ACRL, and other relevant venues.

The project website will be created in Year 1 and will be frequently updated. The website will include information about each research lab, the members of each lab, and summaries of the research projects that librarians and students conduct. We will also incorporate a community blog into our project website. All project participants will blog about the activities of the lab, research questions, and findings. Finally, we will incorporate *Altmetrics* into our website and blog so that we can leverage social media for the promotion of the grant, our findings, and its impact; we will be able to track how people are sharing information about the project via Facebook, Twitter, Tumblr and a variety of other social media platforms commonly used today.

All participants will be encouraged to present their research at appropriate conferences. With the provided travel funding, librarians and students will be able to choose a venue for their presentations beyond a traditional LIS conference. The members of each research lab may choose to co-author their work as a journal article.

UMSI and U-M Library will also disseminate news releases to promote the grant program and research projects via their respective websites, newsletters, and social media outlets. To thoroughly document the work of the

project, in year three of the grant, we will publish the *Mentoring Handbook* with a "No Rights Reserved" Creative Commons license, which means that it will be freely available online. The handbook will be downloadable from the project website in multiple formats, including EPUB 3.0, HTML, and PDF. It will also be downloadable for e-readers and computers and will be searchable and discoverable online. The pre-print handbook will be accessible and preserved in U-M's institutional repository, *Deep Blue*.

3. Diversity Plan

Since we will be recruiting first-year master's students in the University of Michigan School of Information (UMSI) Master of Science in Information program (MSI), our project's diversity plan is strongly tied to the School's diversity recruitment activities. We will rely on three strategic diversity plans to assure that this project will be able contribute to the field-wide effort in diversifying the 21st century librarians.

First, the PI Rieh (Director of the MSI Program) and the Co-PI Yakel (Senior Associate Dean for Academic Affairs) have been working closely with the UMSI Office of Student Affairs (OSA), which has substantial in-house expertise in recruitment and admissions. We will work with Laura Elgas, Director of Admissions and Student Affairs to make further commitment to diversifying the student body in the MSI Program and introduce the LARS Fellows Program to perspective students (See the support letter from Elgas). Under the leadership of Elgas, the OSA staff has developed many contacts and leads, particularly targeting diversity applicants, broadly defined. Diversity broadly defined focuses recruitment activities on students who are not well represented in higher education, such as underrepresented minorities, first generation college students, veterans, and women students in STEM. UMSI OSA staff have been actively involved (providing guest presentations and consulting) in the University of Pittsburgh's iSchool Inclusion Institute (I3), a summer program that supports diverse undergraduates interested in information science to prepare for successful entry into graduate school. We also participate in the Archival Education and Research Initiative (AERI) Emerging Archival Scholars program. OSA publicizes our program and gives workshops at numerous national programs focused on increasing diversity in higher education, such as the McNair Scholars Program, Gates Millennium, Project 1000, California Diversity Forum, Grace Hopper Celebration of Women in Computing, the Society of Hispanic Professional Engineers (SHPE), the National Society of Black Engineers (NSBE), the Society of Women Engineers (WISE) and the National Consortium for Graduate Degrees for Minorities in Engineering and Sciences (National GEM Consortium). Diversity recruitment initiatives also utilize the many recruitment opportunities available through UM as a whole, such as the Michigan-Louis Stokes Alliance for Minority Participation (LSAMP).

Second, we will collaborate on recruitment outreach with student organizations, such as UMSI Multicultural Information Exchange (MIX) to advertise the project. Its mission is to support historically underrepresented students by connecting them with networking, mentoring, and research opportunities and to actively participate in student recruitment. The initiative and commitment of current minority students, among others, has been essential in these efforts. The project team will collaborate with MIX on recruitment outreach.

Third, we will post the "call for participation" announcement to the MSI students' mailing list as well as the school building's bulletin boards (see Appendix – Service Expectation and Recruitment). We will also hold information sessions for students in which lab directors, librarian mentors, and participating students will discuss the benefits of participation. The information sessions will take place in October 2017, February 2018, and February 2019. For the 2018 and 2019 information sessions, the current LARS Fellows will be invited to share their first-hand experiences with perspective Fellows. The Annual Symposium will be open to the UMSI Community so that prospective LARS Fellows could interact with current Fellows directly.

4. Sustainability Plan

After the project is completed, UMSI will take responsibility of maintaining the project website so that other LIS schools are able to adopt our model for their students' internship, practicum, or field experience programs. The training materials prepared for Monthly Research Seminars will be uploaded so that other LIS schools can utilize and revise for their own programs. The methods and measures to be developed to assess the success of our proposed project with respect to process-based evaluation and outcome-based evaluation will provide insights in addressing how students and librarians have gained knowledge, skills, and abilities by participating

in the program and how the program has made a difference in their professional goals and identity. The findings, interpretations, and lessons learned from the evaluation studies will be also available to the public in the project website. The *Mentoring Handbook* will serve as an invaluable tool that can walk an institution through the necessary steps to implement a new mentoring program, moving away from one-on-one mentoring to collaborative mentoring at the research lab settings. 30 UMSI graduates who participated in the project will become specialists in the area of library assessment, evidence-based practices, and designing thinking approaches in academic libraries. These students are also likely to implement some components of project activities in their own library work settings.

5. National Impact

As academic libraries increasingly serve as hubs for digital learning and scholarly communication, librarians are expected to become expert information professionals who are capable of demonstrating the effectiveness of library services and collections as anchors for digital learning and scholarship as well as contributing to the larger teaching, research, and service missions of the university. The proposed project will have the following impacts on LIS education and practice.

(1) The creation of a replicable library as research lab model. The proposed project will establish a new model for student-librarian-faculty teams to learn, practice, and engage in evidence-based approaches to complex problems. This will set up an innovative model for LIS students' co-curricular experience, which goes beyond engaging in traditional library functions. The model, complete with documentation, will be exportable to other LIS program-academic library pairs and further the creation of a cohort of practitioners conversant in research and evidence based practice. Although the proposed project will establish three interrelated research labs, focusing on library assessment, analytics, and designing thinking approaches, specific themes of future research labs could be tailored by the library-LIS school pairs. We will share the resources and protocols we used to help other LIS schools and libraries adopt this model. The results of evaluation studies will be disseminated nationally project website, community blogs, webinars, conferences, and publications.

(2) Building research skills and professional capabilities in the academic library workforce. Although most LIS programs offer research methods courses in their curriculum, simply taking coursework is not enough for LIS students and professional librarians to master evidence-based practices. This project will educate future librarians and provide continuing education to current practitioners so that they develop research skills to lead the research projects and apply evidence-based approaches to practice. The project will strengthen students' and librarians' abilities to investigate an existing context systematically and build their evidential and critical thinking skills so they can develop solutions to complex problems using strong analytical and logical arguments.

(3) Fostering and enhancing mentoring capabilities in the profession. Professional education and development often focus on helping students or junior librarians make transition to the professional environment and learning tacit knowledge from experienced professionals (Goodsett & Walsh, 2015; Lacy & Copeland, 2013). By learning and practicing mentoring in research lab settings, the proposed project will be able to demonstrate how mentoring experiences could lead librarians to gain a stronger professional identities as they are likely to influence students' learning more directly. The results from the project evaluation studies as well as the *Mentoring Handbook* to be published will provide insights to the LIS field by revealing how librarians' research activities and pedagogical engagement (Lee, Dennis, & Campbell, 2007) can provide librarians the opportunity to foster and enhance mentoring capabilities which may help them become an educator for their peer librarians.

Participating UMSI master's students and University of Michigan librarians may appear to be direct beneficiaries of the proposed project. However, we believe that LIS educators, LIS students, and academic librarians who are seeking alternative experiential programs will also benefit because they will be able to replicate and adapt our research lab model.

Schedule of Completion

Milestone	Time Table																	
	Oct '17 - Dec '17		Jan '18 - April '18		May '18 - Aug '18		Sept '18 - Dec '18		Jan '19 - Apr '19		May '19 - Aug '19		Sept '19 - Dec '19		Jan '20 - Apr '20		May '20 - Sept '20	
Set up the project website																		
Maintain community blog within the project website																		
Convene Advisory Board																		
Recruit and select students																		
Mentoring Workshop																		
Conduct research projects 10 hours per week																		
Bi-Weekly Lab Meetings																		
Montly Research Seminar																		
Students and librarians co-author a paper																		
Annual Symposium																		
Conduct evaluation studies																		
Write mentoring guidelines and workshop materials																		
Publish *Handbook*																		
Write reports, articles, conference presentations (PI and Co-Pis)																		

DIGITAL PRODUCT FORM

Introduction
The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (i.e., digital content, resources, assets, software, and datasets). The products you create with IMLS funding require careful stewardship to protect and enhance their value, and they should be freely and readily available for use and re-use by libraries, archives, museums, and the public. However, applying these principles to the development and management of digital products can be challenging. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and practices that could become quickly outdated. Instead, we ask that you answer questions that address specific aspects of creating and managing digital products. Like all components of your IMLS application, your answers will be used by IMLS staff and by expert peer reviewers to evaluate your application, and they will be important in determining whether your project will be funded.

Instructions
You must provide answers to the questions in Part I. In addition, you must also complete at least one of the subsequent sections. If you intend to create or collect digital content, resources, or assets, complete Part II. If you intend to develop software, complete Part III. If you intend to create a dataset, complete Part IV.

PART I: Intellectual Property Rights and Permissions

A.1 What will be the intellectual property status of the digital products (content, resources, assets, software, or datasets) you intend to create? Who will hold the copyright(s)? How will you explain property rights and permissions to potential users (for example, by assigning a non-restrictive license such as BSD, GNU, MIT, or Creative Commons to the product)? Explain and justify your licensing selections.

Handbook: The Library as Lab Handbook will be given a Creative Commons CCO, "No Rights Reserved" which means that the handbook will be public domain.

Website: According to U-M Standard Practice Guide 601.28 (http://spg.umich.edu/policy/601.28) This policy promotes the University of Michigan's scholarly, academic, and service missions by establishing a framework for who holds copyright at the University. Because the University is committed to academic freedom, it strives—despite the legal default—to place copyright with the creators of scholarly, academic, and artistic works. Moreover, this policy encourages and does not limit the rights and abilities of people to make "fair uses" or other lawful uses of copyrighted works. Therefore The Library as Lab Website copyright is owned by the Regents of the University of Michigan, however, the University, hereby, transfers any copyright it holds in SCHOLARLY WORKS to the persons who authored those works. The project investigators intend to license content using the Creative Commons BY (CC-BY) license and software using a BSD license, as these licenses grant broad rights for sharing and reuse. We will apply the appropriate license in consultation with UM Policy and the UM Office of Technology Transfer as needed.

A.2 What ownership rights will your organization assert over the new digital products and what conditions will you impose on access and use? Explain and justify any terms of access and conditions of use and detail how you will notify potential users about relevant terms or conditions.

Handbook: None, the Library as Lab Handbook will be freely available online as a PDF and EPUB via the University of Michigan's Institutional Repository, Deep Blue (http://deepblue.lib.umich.edu/). It will also be freely available in full-text HTML on the Library's publishing platform, DLXS (http://quod.lib.umich.edu/lib/colllist/).

Website: None, the Library as Lab Website will be hosted by the U-M School of Information and freely available online. This Website will contain the form in which students and librarians post a research proposal and a biography. UMSI students must login with U-M credentials in order to post information to the website. The information posted by staff and UMSI students will be owned by its creators. UMSI reserves the right to review the information and to refuse or remove any publicly accessible content that contains personally identifiable information such as social security numbers. Should the terms or conditions change, all users will be notified via email. As described in I.A.1, the University of Michigan copyright policy grants copyright for Scholarly Works back to their faculty creators. It is our understanding that all works created as part of this project meet these criteria.

A.3 If you will create any products that may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities, describe the issues and how you plan to address them.

Handbook: No. The Library as Lab Handbook will not contain data that violate the privacy of the project participants.

Website: No. The Library as Lab Website will not contain data that violates the privacy of the project participants. Although participants will be required to post a biography and a research proposal to the form residing in the project website, which is only open to participants, we will not accept information such as mailing address or other kinds of personally identifiable information

Part II: Projects Creating or Collecting Digital Content, Resources, or Assets

A. Creating or Collecting New Digital Content, Resources, or Assets

A.1 Describe the digital content, resources, or assets you will create or collect, the quantities of each type, and format you will use.

Handbook: The Handbook will be a single publication, about 75 pages in length. It will be published by Michigan Publishing Services (http://www.publishing.umich.edu/services/), a division of the Library's publishing unit. The Handbook will be made freely available in PDF, EPUB, and HTML formats.

Website: The Library as Lab Project Website will be in xml and html. The project website will include general information about the grants and updates. Users will be free to download project reports, the mentoring Handbook, list of research projects conducted in research labs every year for three years, publications, and presentation materials. We estimate that the site will include 5-10 web pages hosting 100 pages of PDF files.

A.2 List the equipment, software, and supplies that you will use to create the content, resources, or assets, or the name of the service provider that will perform the work.

Handbook: The Handbook will be written and edited in Microsoft Word. The final, published version will be prepared by Michigan Publishing Services using Adobe InDesign (for the PDF) and PressBooks (for the EPUB and HTML).

Website: Drupal

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG) you plan to use, along with the relevant information about the appropriate quality standards (e.g., resolution, sampling rate, or pixel dimensions).

Handbook: The PDF version of the publication will be prepared to the PDF/A standard (ISO 19005). The EPUB will be compliant with EPUB 3.01 (ISO/IEC TS 30135). The HTML will be complaint with HTML 4.01. All embedded images in all versions will be in TIFF, JPEG, or PNG formats at a minimum of 150 dpi.

Website: HTML, XML, TIFF files will be created. Tiff files are for access only and do not require high resolution.

B. Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan (i.e., how you will monitor and evaluate your workflow and products).

Handbook: The publication will be copy edited and proofread by Michigan Publishing Services prior to publication, with the authors given a chance at each stage to evaluate suggested corrections and changes. Each format of the publication (PDF, ePub, HTML) will also be evaluated by a trained Digital Publishing Coordinator before it is publicly released, according to standard publication workflows.

Website: A master's student in the School of Information at the University of Michigan will be hired as a web developer for the Library as Lab Project website. We have send out a recruiting email to the student class mailing list (N=350), and ask them to submit their portfolio to assess the quality of their previous work. We budgeted the salary for the developer so that he/she would spend sufficient time in developing a high-quality website. Once the project website is released in December 2017, the PI will be responsible for maintaining the site by posting reports, guidelines, and any other relevant information and update news about the progress of the projet. The PI worked as a User Experience Designer at a search

engine company Excite@Home before joining the U-M. Therefore, she has sufficient technical skills to monitor and maintain the high-quality website.

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period of performance. Your plan may address storage systems, shared repositories, technical documentation, migration planning, and commitment of organizational funding for these purposes. Please note: You may charge the federal award before closeout for the costs of publication or sharing of research results if the costs are not incurred during the period of performance of the federal award (see 2 C.F.R. § 200.461).

Handbook: The PDF file and the EPUB3 file will be deposited into U-M's Institutional Repository, Deep Blue (http://deepblue.lib.umich.edu/). Deep Blue will preserve the metadata and the publication that it describes. Deep Blue provides storage and preservation services to ensure the longevity of deposited materials, even when the original application in which it they were created is obsolete and the means to access it are inoperable. For each deposit, Deep Blue: 1) Provides persistent storage, including appropriate back-up and recovery procedures; 2) Assigns a unique persistent identifier (URI) that will not change and is appropriate to cite in other works; 3) Supports a range of service levels for preservation and notifies users of Deep Blue's preservation constraints; 4) Stores provenance information; and 5) Maintains an auditable history and record of changes. The HTML version will be hosted in the Library's DLXS publication platform, which produces HTML on the fly from TEI-based XML documents, and will be migrated intact to any future platforms. DLXS is hosted on the University's IT infrastructure, which provides redundant backups.

Website: The entire website will be deposited into U-M's Institutional Repository Deep Blue (http://deepblue.lib.umich.edu/) is the University of Michigan's permanent, safe, and accessible service. Deep Blue will preserve the metadata and the website that it describes. Deep Blue provides storage and preservation services to ensure the longevity of deposited materials. Users should be assured that content deposited in many formats will be accessible even when the original application in which it was created is obsolete and the means to access it are inoperable. For each deposit, Deep Blue: 1) Provides persistent storage, including appropriate back-up and recovery procedures 2) Assigns a unique persistent identifier (URI) that will not change and is appropriate to cite in other works 3) Supports a range of service levels for preservation and notifies users of Deep Blue's preservation constraints; 4) Stores provenance information; and 5) Maintains an auditable history and record of changes to Deep Blue

C. Metadata

C.1 Describe how you will produce any and all technical, descriptive, administrative, or preservation metadata. Specify which standards you will use for the metadata structure (e.g., MARC, Dublin Core, Encoded Archival Description, PBCore, PREMIS) and metadata content (e.g., thesauri).

Handbook: The PDF and EPUB file will be accompanied with descriptive metadata once deposited in Deep Blue. Title, Creator/Owner, Date of publication/creation/issue, DOI (URI), abstract, type Handle (URI), citation, language, rights holder, and owning collection name are the metadata elements used to describe all content deposited in Deep Blue. The PIs will ensure that the metadata records are comprehensive, accurate, and complete. Descriptive metadata for the HTML version will encompass the above and be provided publicly by an OAI-PMH feed.

Website: The HTML and XML filse will be accompanied with descriptive metadata once it is deposited in Deep Blue. Title, Creator/Owner, Date of publication/creation/issue, DOI (URI), abstract, type Handle (URI), citation, language, rights holder, and owning collection name are the metadata elements used to describe all content deposited in deep blue. The PIs will ensure that the metadata records are comprehensive, accurate, and complete.

C.2 Explain your strategy for preserving and maintaining metadata created or collected during and after the award period of performance.

Handbook: Deep Blue will preserve both the metadata and the publication that it describes. The persistent storage and format migration commitments of Deep Blue (see B.2 above) will ensure that all metadata survives to accompany the publication in future iterations. Similarly, the DLXS platform stores publication metadata in an XML format that will be transformed and migrated for future platforms.

Website: Deep Blue will preserve the metadata and the publication that it describes. Deep Blue provides storage and preservation services to ensure the longevity of deposited materials. Users should be assured that content deposited in many formats will be accessible even when the original application in which it was created is obsolete and the means to

access it are inoperable. For each deposit, Deep Blue: 1) Provides persistent storage, including appropriate back-up and recovery procedures 2) Assigns a unique persistent identifier (URI) that will not change and is appropriate to cite in other works 3) Supports a range of service levels for preservation and notifies users of Deep Blue's preservation constraints; 4) Stores provenance information; and 5) Maintains an auditable history and record of changes to Deep Blue

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content, resources, or assets created during your project (e.g., an API [Application Programming Interface], contributions to a digital platform, or other ways you might enable batch queries and retrieval of metadata).

All Deep Blue content is discoverable by Google and other search engines. Deep Blue content can also be harvested by the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) and accessible via the library's Articles+ discovery system which is powered by ProQuest's Summon service. Articles+ lets patrons search concurrently across thousands of journals and newspapers. This service provides an easy, single search of most electronic resources licensed by the University of Michigan Library. DLXS collections are indexed by Google and also cataloged individually by the Library. They are then made available to OCLC WorldCat for inclusion.

D. Access and Use

D.1 Describe how you will make the digital content, resources, or assets available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content).

Handbook: The publication, across all of its formats, will be openly available online to all audiences via standard web browsers (HTML) eReaders (EPUB) and PDF viewers (PDF). Deep Blue publications (PDF,EPUB) are discoverable via Google and other search engines. U-M's DLXS collections (HTML) are indexed by Google and Google Scholar and also cataloged individually by the Library. These catalog records are then made available to OCLC WorldCat for inclusion.

Website: The general project webpages will be openly available online to anyone.

D.2 Provide the name(s) and URL(s) (Uniform Resource Locator) for any examples of previous digital content, resources, or assets your organization has created.

Student Handbook for Global Engagement http://deepblue.lib.umich.edu/handle/2027.42/87987

Surveying the Landscape: Arts Integration at Research Universities http://hdl.handle.net/2027/mdp.39015095766708

Part III. Projects Developing Software

A. General Information

A.1 Describe the software you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) it will serve.

A.2 List other existing software that wholly or partially performs the same functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

B. Technical Information

B.1 List the programming languages, platforms, software, or other applications you will use to create your software and explain why you chose them.

B.2 Describe how the software you intend to create will extend or interoperate with relevant existing software.

B.3 Describe any underlying additional software or system dependencies necessary to run the software you intend to create.

B.4 Describe the processes you will use for development, documentation, and for maintaining and updating documentation for users of the software.

B.5 Provide the name(s) and URL(s) for examples of any previous software your organization has created.

C. Access and Use

C.1 We expect applicants seeking federal funds for software to develop and release these products under open-source licenses to maximize access and promote reuse. What ownership rights will your organization assert over the software you intend to create, and what conditions will you impose on its access and use? Identify and explain the license under which you will release source code for the software you develop (e.g., BSD, GNU, or MIT software licenses). Explain and justify any prohibitive terms or conditions of use or access and detail how you will notify potential users about relevant terms and conditions.

C.2 Describe how you will make the software and source code available to the public and/or its intended users.

C.3 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository:

URL:

Part IV: Projects Creating Datasets
A.1 Identify the type of data you plan to collect or generate, and the purpose or intended use to which you expect it to be put. Describe the method(s) you will use and the approximate dates or intervals at which you will collect or generate it.

A.2 Does the proposed data collection or research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity been approved? If not, what is your plan for securing approval?

A.3 Will you collect any personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information? If so, detail the specific steps you will take to protect such information while you prepare the data files for public release (e.g., data anonymization, data suppression PII, or synthetic data).

A.4 If you will collect additional documentation, such as consent agreements, along with the data, describe plans for

preserving the documentation and ensuring that its relationship to the collected data is maintained.

A.5 What methods will you use to collect or generate the data? Provide details about any technical requirements or dependencies that would be necessary for understanding, retrieving, displaying, or processing the dataset(s).

A.6 What documentation (e.g., data documentation, codebooks) will you capture or create along with the dataset(s)? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the dataset(s) it describes?

A.7 What is your plan for archiving, managing, and disseminating data after the completion of the award-funded project?

A.8 Identify where you will deposit the dataset(s):

Name of repository:

URL:

A.9 When and how frequently will you review this data management plan? How will the implementation be monitored?