University of Tennessee

Abstract

CALL (Collaborative Analysis Liaison Librarians) is a new three-year instructional Lifelong Learning Master's Level Project grant proposed by a team of LIS educators at the University of Tennessee's School of Information Sciences (UT-SIS) who will collaborate with UT Libraries, the University of Denver Morgridge College of Education, Oak Ridge National Laboratory (ORNL), the United States Geological Survey (USGS), and the National Center for Atmospheric Research (NCAR) to educate a cohort of 14 new leaders in library liaison roles. This project will bring together an interdisciplinary and interagency team to recruit, educate and mentor this cohort with a specific focus on building liaison skills for collaboration with researchers in science-focused agencies and to build curriculum and skills for liaison librarianship that can be shared with other LIS master's programs that wish to adopt it. In CALL, each student will benefit from an immersive practicum in a participating science agency, mentoring relationships with experts in STEM librarianship and science information services, and an ALA-accredited Master's degree from UT-SIS or DU with a specialization in liaison librarianship. Curriculum will be assessed and a course specific to science liaison librarianship will be developed and delivered to students during their time at UT-SIS or DU. As a capstone to the project, CALL will sponsor a summit to share best practices and insights from the curriculum with practicing STEM and LIS professionals.

Starting in July 2019 and ending in June 2022, the CALL project team will accomplish the following four main objectives:

Objective 1. To educate a cohort of 14 future collaborative liaison librarians to improve the processes of scientific research.

Objective 2. To conduct a job analysis of the knowledge, skills, and abilities required for current science liaison librarians.

Objective 3. To study scientists' information needs to facilitate collaborative analysis.

Objective 4. To disseminate study findings related to the other objectives.

To meet these objectives, several activities will occur throughout the three-year project. The UT-SIS, UT Libraries, and DU Department of Research Methods and Information Science will (1) implement a recruitment plan; (2) develop and deliver a Science Liaison Librarianship course; (3) design and facilitate Science Practica; (4) participate in cohort-building activities that include original research on science liaison librarianship job analyses and scientists' information needs; and (5) disseminate findings via a summit and a plethora of new research on the collaborative tasks of scientists and librarians disseminated through relevant conferences, venues, and publications.

Educating this cohort of library professionals to take on liaison roles in science organizations will help librarians successfully navigate their rapidly evolving roles within the increasingly complex, collaborative and digital scientific research world. Librarians are now participating actively in all stages of the research process, working directly with science professionals and researchers and taking a leadership role in building bridges between libraries and scientists. Librarians need to be proactive in adopting these new roles by honing their teamwork and community engagement skills in order to collaborate, analyze and serve as full-partner liaisons. However, master's programs often fail to introduce and build on these abilities and competencies as core components of a library professional's skillset. By helping LIS students learn to extend and reshape their role through collaboration across disciplines, departments, and institutions, CALL can play a pivotal role in helping to shape the liaison librarian of tomorrow. Further, as a Lifelong Learning project, it will strengthen established relationships and provide ways to foster new and ongoing collaborations with mentors, librarians, and researchers at science organizations.

Collaborative Analysis Liaison Librarians (CALL) (Master's Level Project)
Project Narrative

1. Statement of Broad Need

A team of LIS educators at the University of Tennessee's School of Information Sciences (UT-SIS), working with University of Tennessee Libraries, the University of Denver (DU) Morgridge College of Education's Department of Research Methods and Information Science, Oak Ridge National Laboratory (ORNL), the United States Geological Survey (USGS), and the National Center for Atmospheric Research (NCAR) propose Collaborative Analysis Liaison Librarians (CALL), a new three-year master's level instructional project to educate a cohort of 14 leaders in library liaison roles and develop model experiential learning and curriculum for the future. CALL aligns with IMLS' Lifelong Learning goal by bringing together an interdisciplinary and interagency team to recruit, educate, and mentor this cohort with a specific focus on building science liaison skills through collaboration with researchers in science-focused agencies and to develop curriculum and skills that can be shared with others. Each CALL student will benefit from an immersive practicum in a participating science agency, build mentoring relationships with experts in STEM librarianship and science information services, and graduate with an ALA-accredited Master's degree with a specialization in liaison librarianship. Job analyses of these emerging liaison roles will be conducted to inform curriculum development of a science liaison librarianship course that will be delivered to the cohorts. The project capstone that promotes dissemination is a summit to share best practices, educational materials, and other insights from the curriculum development and implementation with practicing STEM and LIS professionals.

Today's scientific researchers are facing large-scale challenges as they try to navigate massive quantities of digital data, work across disciplinary boundaries, and keep pace with the requirements of data management plans and preservation needs (Jaguszewski & Williams, 2013). Taking on all of these new tasks while also focusing on their increasingly complex research projects requires a new kind of approach to research that can be facilitated by partnerships with information specialists. As a result, academic and government librarians are facing rapidly evolving roles. These new roles are understudied, but anecdotally can take on a variety of old and new names: Science Librarian, Liaison Librarian, Science Information Officer, eScience Specialists, and Science Informationist, to name a few. No matter what their official title, these librarians are adopting innovative roles as liaisons *within* the science community. In these roles, librarians are active participants in the research process rather than just supporters, working directly with science professionals and researchers and taking on leadership duties to build bridges between libraries and scientists (Rockenbach et al., 2015). They expand the roles of librarians and the perception in science-related organizations of what librarians can do.

These roles include direct participation in all phases of research, requiring an intense focus on lifelong learning as new liaison librarians gain knowledge, skills, and abilities to help scientists keep up with the latest data and information requirements. Some institutions, seeing the need for librarians to more effectively facilitate collaborative research, have begun to restructure the more traditional liaison model into teams of library professionals tasked with establishing and maintaining deeper relationships with researchers and providing targeted, intensely focused collaborative services to research teams (Allen & Chavez, 2018; D'Elia & Horne, 2018; Flaxbart, 2018), This repositioning of the librarian's role means that libraries need to be proactive both with each other and with the scientific communities they serve, building collaborations for research, participating directly in research and science, and analyzing the impact to science. To practice and demonstrate this commitment, librarians must learn the best ways to *collaborate, analyze,* and serve as full-partner *liaisons*. These new and expanded roles create the need for a commitment to *lifelong learning* on the part of these librarians. In addition, more studies of the knowledge, skills, and abilities that *current* librarians need in order to excel in science liaison positions

would assist in creating the relevant coursework, writing job descriptions, and anticipating developing trends.

The liaison role in some form is not completely new, but CALL envisions a new form of liaison. In the early 1990s, an ARL SPEC survey envisioned challenges that remain relevant today, such as the need for new methods of assessment for liaison activities and the potential for new roles of liaisons as active partners in research teams (Latta, 1992; Rockenbach et al., 2015) However, the roles of these liaisons continue to evolve swiftly and sometimes unpredictably with the digital world. While liaisons used to serve primarily as subject specialists playing a support role, they now hold the responsibility of participating in research and scholarship along with the researchers (Bales, 2015). Recent examinations of the training and reskilling needs for the liaison's role have emphasized the necessity to place the liaisons' work in the context of the broader challenges the institution is facing, such as shifts in research output expectations and new requirements in data management policies (Rockenbach et al. 2015). Curriculum and experiences in ALA-accredited Master's degree programs must keep pace as each revision and reiteration of the liaison's role reveals more about what is required to meet the rapidly changing needs of the research community (D'Elia & Horne, 2018). CALL features advanced research participation with scientists throughout the entirety of the research lifecycle (See Figure 1). The CALL model constructs a unique combination of intense collaboration that educates information professionals to understand how scholars in a particular discipline communicate and share information, how to communicate these concepts across disciplines and to the public, how to tackle data management successfully, and how to design and develop systems to support these collaborative structures (Jaguszewski & Williams, 2013). The liaisons themselves must be adept at pooling resources and collaborating with many different types of colleagues across disciplines and organizations, playing the role of the "team builders" (Hahn, 2009). Both scientists and librarians learn an expanded role for information professionals during these activities.

Figure 1. The CALL Model. Adapted from the data lifecycle as proposed by DataONE (www.dataone.org/data-life-cycle).

In a recent SPEC survey of ARL member libraries, 93 percent of respondents indicated that their organizational structure includes librarians or other library staff with liaison responsibilities (Miller & Pressley, 2015). The majority of participants in this survey reported collaborative and research-intensive tasks such as providing one-on-one research consultations, outreach and communication, consulting on scholarly communication, and data management support as core liaison duties. Nearly all participants indicated that it was essential for liaisons to share expertise and solve problems collaboratively. Yet, recent research has found that a significant percentage of students feel their Master's in Library and Information Science degree did not properly train them in areas of teamwork and research methodology (Day & Szurek, 2018; Fleming-May & Mays, 2015), which are vital skills for any information professional serving in a liaison role. IMLS has noted that an increasing number of grant applications are focusing on continuing education in many areas that touch on these skills, signaling that graduate

programs may be failing to introduce these knowledge, skills, and abilities at the optimum time to learn them—during their program of study (IMLS, 2017).

A focus on research, lifelong learning, science community engagement, and assessment to build vital collaborations into the future are key to the CALL project. The specialized graduate coursework will result from job analyses (see Appendix A: Science Liaison Librarianship Course Outline) of existing science liaisons to assess the knowledge, skills, and abilities needed as well as studies of the scientists' information needs (Bishop & Hank, 2018). This systematic process to curriculum development ensures relevance to the current occupations in these areas. The UT-SIS, with its close proximity to major science organizations such as ORNL and established career pathways educating future library professionals in science information and data science, data curation and data management, geographic information, and assessment, provides an ideal scaffolding to craft the CALL education and training (https://www.sis.utk.edu/pathway-faqs). The DU's Department of Research Methods and Information Science provides a rich resource of faculty with expertise in liaison librarianship and a specialization in research data management, as well as access to leading science organizations such as the USGS Denver office and NCAR in nearby Boulder. By helping LIS students study, extend, and reshape these new roles through collaboration across disciplines, departments, and institutions, CALL can play a pivotal role in laying a conceptual foundation and body of knowledge for the liaison librarians of tomorrow. Further, as a *Lifelong Learning* project, CALL will strengthen established relationships and provide ways to foster new and ongoing collaborations with mentors, librarians, and researchers at science organizations, through the summit to bring together present and future liaison librarians with STEM professionals to fortify sustainable partnerships. Also, a plethora of new research on the collaborative tasks of scientists and librarians disseminated through relevant conferences, venues, and publications, will increase the reach and broader impact of this project.

2. Project Design
The goal of this three-year project is to expand knowledge of science liaison librarianship. The project will address broad research questions related to the practice and implementation of science liaison librarianship:

- What knowledge, skills, and abilities are required for science liaison librarianship?
- What tasks and topics should be included in curriculum to best prepare future science liaison librarians?
- What are common and frequent information needs of scientists served by liaisons?
- How can the capabilities and roles of science liaison librarians be conveyed to scientists?

The broad research questions for this project will address these specific needs by accomplishing the following four objectives:

Objective 1. Educate a cohort of 14 future collaborative liaison librarians to improve the processes of scientific research.
Objective 2. Conduct a job analysis of the knowledge, skills, and abilities required for current science liaison librarians.
Objective 3. Study scientists' information needs to facilitate collaborative analysis.
Objective 4. Disseminate study findings related to the other objectives.

To meet these objectives, several activities will occur throughout the three-year project.
The UT-SIS, UT Libraries, and DU Department of Research Methods and Information Science will (1) implement a recruitment plan; (2) develop and deliver a Science Liaison Librarianship course; (3) design and facilitate Science Practica; (4) participate in cohort-building activities that include original research

on science liaison librarianship job analyses and scientists' information needs; and (5) disseminate findings via a summit and a plethora of new research on the collaborative tasks of scientists and librarians disseminated through relevant conferences, venues, and publications.

Recruitment Plan. SIS student recruitment includes data-driven marketing planning utilizing Web and Social Analytics data, which includes demographic, socio-economic, and geographic metrics. This attracts a diverse student base and can target students with backgrounds in science. Marketing for the grant will assist DU recruitment as well. To mitigate the risk of not being able to recruit sufficient numbers of students with science backgrounds, CALL will be open to students with bachelor's degrees in all sciences and social sciences and will enlist our science agency partners to assist with year one recruitment. The first cohort of up to 7 students will begin in year one and graduate in year two, and the second cohort of up to 7 students will begin in year two and graduate in year three, which allows our science partners and mentors to develop their programming, allows continual improvement of the experience, and sets the path for sustainability. Our partners at ORNL, USGS, and NCAR will assist in recruitment In the unlikely event that the number of qualified students selected the first year falls short of the target, the remaining number will be admitted the second cohort, when there will be more time to fully extend a comprehensive recruitment effort. Details on current and ongoing efforts to recruit a diverse cohort are outlined in the Diversity Plan.

Each student in the CALL program will fully participate in a combination of hands-on work and educational experiences, resulting in the respective Master's degree, in either Information Sciences from UT or Library and Information Science from DU, with a specialization in liaison, data management, research, and outreach in a variety of science agencies. After successful recruitment, admission into the programs will be staggered: the first cohort of up to seven students will be admitted to the program (six at UT and one at DU), and this will repeat the following year with the second cohort.

Existing coursework at the institutions is outlined below. Each student will experience an enhanced curricular program of a total of 39 semester graduate credits (or 58 quarter credits) in Information Sciences and related relevant areas, which will include a variety of required courses and electives:

1) Core classes that cover overviews of information environments, information organization, and information access and retrieval and information technology (9 credits or quarter equivalent) [existing required courses];
2) Courses in statistics, research methods, assessment of information agencies, and/or research participation (6 credits or quarter equivalent) [existing courses];
3) Science and data-related elective courses selected by each student, including Geospatial Technologies, Geospatial Data Management, Government Information Sources, Scientific and Technical Communications, Database Management Systems, and/or Big Data Analytics (9 credits or quarter equivalent) [existing courses].
4) Courses in science information agencies and their role in communities; science information sources/science communication, and the **new** course Science Liaison Librarianship—development details in the following section and course outline in Appendix A (9 credits or quarter equivalent); and
5) Specialized tailored practicum with workplace mentors in science agencies during the second year of each student's coursework described in the Science Practica section below (6 credits or quarter equivalent);

UT students will complete their coursework and practica in the Knoxville area and the DU students will complete their coursework practica in the Denver/Boulder area.

Development and delivery of the Science Liaison Librarianship course. The PIs will work with their partners to develop a course on Science Liaison Librarianship during the first year of the grant, which will be delivered to the students starting in the second year as a key part of the curriculum. The development of this course will not only rely on expertise of the partners, but also on job analyses of science liaison librarians and the information needs of the scientists they serve via interviews. The interviews will infuse real-world liaison experiences and their scientists' information needs as well as scholarly outputs increasing knowledge of these emerging professions. The Science Liaison Librarianship course will be delivered to all students beginning in the second year of the project and will be open to other interested students at DU and UT.

Using data gathered from formative and summative assessment and in consultation with the partners, the team will create a new career pathway for Science Liaison Librarianship that will include curriculum for courses tailored to the needs of library professionals working in different science domains. These pathways can be used to direct lifelong learning for working librarians, as well as to form a guide for new LIS students.

Science Practica. As the capstone of this curriculum, each student will participate in an invaluable experiential-intensive practicum that sees them closely mentored by our institutional partners. Students will gain first-hand experience with the roles of liaison librarians and participation in agency-focused research as the liaison. These practica will take place at science organizations, including ORNL, USGS (Denver, Reston, and/or Oak Ridge Offices) and NCAR, with academic supervision from UT or DU faculty. In these practica, students will build key liaison skills through activities such as helping researchers manage the data resulting from large-scale research projects, working as the information specialist on grant-writing and research projects, helping to identify research resources, data analysis, and other information-related activities on science projects. Students will work one-on-one with a mentor at each of these science organizations. They will meet regularly with these mentors to discuss the progress of their practicum and discuss ways to direct the practicum activities in a way that will provide optimum individual skill building. The peer support networks formed through these interactions will continue to provide lasting connections, professional support, and networking resources to all students throughout the program and even after graduation.

Cohort-building activities. In the first year, despite the limited recruitment time the project team will concentrate their resources to ensure the development of a strong cohort. These resources include mentoring partners at participating science organizations, a broad network of potential contacts from past projects, and existing relationships with minority-rich educational institutions in the region. All institutions involved share a commitment to mentoring and considerable experience building cohorts. Each student will serve as a key contributor to the proposed project activities and gain hands-on experience in the research process by working collaboratively with all involved colleagues.

To tailor the educational experience to each student's interest and goals, during the first semester of each student's coursework the faculty and mentors will assist each individual in developing their own Individual Development Plans (IDP). The IDP will identify skills and strengths that each student wishes to develop, as well as outline approaches that can be taken to ensure the goals of the IDP are met throughout their cohort experience. The IDPs will be reviewed by the research team on a bi-annual basis. (For additional details related to mentoring and cohort management, see Appendix B: Cohort-building activities.)

Summit. As a finale to CALL and to add sustainability and visibility to the project results, the academic and library leaders in the program will work with the science partners to sponsor a summit involving practicing liaison librarians and professionals in the STEM fields on building curriculum and lifelong

learning opportunities for new types of liaison librarians. This summit will share best practices and insights from the curriculum with practicing professionals and highlight the importance of liaison librarianship. All of the curricular materials and pathways will be shared widely in repositories such as GitHub and on the project website. Details about this activity appear in the Dissemination Plan.

Evaluation
This project will be evaluated and assessed at each stage of the project using both formative and summative assessments of recruitment strategies, coursework, practicum, graduation requirements, and ultimately placement in positions within science organizations. The formative incremental assessments will be used to adjust course content, practicum objectives, student experiences, and interactions with the science agency partners. These assessments will be led by an experienced outside evaluator, Martha Kyrillidou, Director and CEO of QualityMetrics, LLC. Dr. Kyrillidou, who was the original architect of StatsQUAL suite of services at the Association of Research Libraries, has helped to define the growing library assessment community of practice over the course of her career. She consults in management, evaluation, assessment and R&D activities, and serves as an expert external evaluator and data analyst for organizations' grant and sponsored activities.

Dr. Kyrillidou will conduct a summative evaluation that includes conducting interviews and surveys of students, mentors, scientist participants, library participants, and faculty advisors to identify program successes, areas needed for improvement, and broader potential impacts of the CALL program. The culminating summit, which will include librarians either currently working in or aspiring to these roles, will also provide a venue for gathering information on summative assessment. Upon completion of the program, the project's overall success will be measured by the following outcomes:

1.   Success in recruiting a diverse cohort;
2.   Knowledge, skills, and abilities gained by the students, measured by their success in coursework and ability to demonstrate learning outcomes;
3.   Successful experiences in participating organizations, measured by partners' evaluations;
4.   Graduation with a M.S. degree in Information Science;
5.   Placement in positions that will allow students to apply their CALL education;
6.   Development of course materials that can be used by a variety of libraries and educators.

Personnel
The University of Tennessee-led team is ideally positioned to lead CALL. PI Wade Bishop; Co-PIs Suzie Allard and Carol Tenopir of the School of Information Sciences, and Senior Personnel Peter Fernandez, Agricultural Sciences & Natural Resources Librarian at UT Libraries, bring demonstrated expertise in recruiting, curriculum development and design, and working with science agencies. The University of Denver's Department of Research Methods and Information Science team will be led by Dr. Mary Stansbury. Her research specialties lie in information policy, the digital divide, health information seeking behaviors, and LIS education. Denver's close proximity to the USGS Denver office and NCAR in Boulder provide opportunities to put liaison librarian skills into practice with science mentors. A Knoxville-based full time project manager will be hired to assist with the administration of the project over the three years.

Partners and mentors Mike Frame, Chief of Scientific Data Integration and Visualization at USGS; Alison Boyer, Chief Scientist at the ORNL Distributed Active Archive Center; and Matthew Mayernik, Project Scientist II & Research Data Services Specialist at NCAR, have worked with UT-SIS on science, data management, and/or assessment projects. These agencies will enhance their collaborations with the CALL program to provide recruitment, training, mentorship, and ongoing research support at both UT and DU.

Financial Resources

For this instructional project the University of Tennessee is requesting total project funds in the amount of $883,034 including direct and indirect cost, $432,836 of which are student costs and $450,198 of which are non-student Direct plus Indirect costs. To make the required 1:1 cost share on non-student funds, the University of Tennessee is matching the requested $450,198 by cost sharing in the amount of $452,889. The cost share from the University comes from student costs (stipend, health insurance, and tuition), faculty salaries and fringe plus indirect costs. For more details, see the attached Budget Justification.

Timeline

Year 1: July 2019 - June 2020	Year 1: 7 students (6 at UT and 1 at DU)
July-August 2019	Beginning of grant: meet and teleconference with partnering organizations and mentors. Implement aggressive recruiting plan.
	Hire project manager; start project website.
	Admit up to 7 students to begin Fall 2019. Orientation for 1st cohort jointly with UT and DU in August. The 1st cohort will meet with their academic advisors to create their Individual Development Plans (IDP) and begin coursework.
September-December 2019	Student formative assessments for 1st cohort for first semester. Student cohort meetings at least twice per month.
	Curriculum development: Begin work with UT and DU teams to conduct job analyses of science liaison librarians and the information needs of the scientists they serve via interviews.
January-April 2020	Meet with and recruit potential students from diverse backgrounds for the 2nd cohort to begin in year 2.
	1st cohort students will travel to submit their research at a conference.
	Make admission decisions; send offers to accepted students for admission in Fall 2020. 2nd cohort of 7 (6 at UT and 1 at DU), will begin in year 2 of the project and join the 7 who began in year 1.
May-June 2020	Formative evaluation activities for year 1 conducted.
	Work with participating organizations to coordinate specific Science Practica opportunities for students in 1st cohort; assign each student a mentor.

Year 2: July 2020-June 2021	Year 2: 14 students (6 new students at UT and 1 new student at DU and the 6 returning students at UT and 1 returning student at DU that will graduate in May 2021)
July-August 2020	New and returning students meet with advisors and prepare for coursework. Orientation for 2nd cohort jointly with UT and DU in August. The 2nd cohort will meet with their academic advisors to create their Individual Development Plans (IDP) and begin coursework.
September-December 2020	Project leaders finalize new course based on expert feedback and job analyses to be delivered in Spring 2021.
	The 1st and 2nd cohorts follow cohort-building activities. Both cohorts meet once a month.

January-April 2021	Work with participating organizations to coordinate specific opportunities for students in 2nd cohort; assign each student a mentor.
	2nd cohort students will meet with mentors to plan work experiences for the following year.
	Deliver a Science Liaison Librarianship course Spring 2021.
May-June 2021	Students meet with faculty to begin planning for the summit to be held in Fall 2021.
	1st cohort students graduate in May 2021.
	Formative evaluation activities for year 2 conducted.

Year 3: July 2021-June 2022	Year 3: 7 students (6 remaining students at UT and 1 remaining student at DU graduate in May 2022). CALL students not funded as part of the IMLS grant may begin coursework.
July-August 2021	2nd cohort will meet with advisors to discuss work experiences for the next two semesters.
	Students review progress and plan for year 2.
	Final plans in place for the summit.
September-December 2021	2nd cohort will take elective courses and complete first semester of work experiences. Student cohort meetings at least twice per month.
	Summit on liaison librarianship will be held in Knoxville or Oak Ridge, TN in October 2021.
January-April 2022	Students will complete their work experience practicum and undergo their final work experience evaluation. Student cohort meetings at least twice per month.
	2nd cohort students will travel to submit their research at a conference.
May-June 2022	Formative evaluation activities for year 3 conducted.
	Summative evaluation performed by outside evaluators.
	2nd cohort students will graduate in May 2022. At the conclusion of the program, conduct exit interviews and final job placement assessments.
	PIs will travel to conferences to disseminate project results and prepare articles for submission to academic journals throughout the project as an ongoing task.
	PI's will prepare and turn in reports to IMLS, and will track career placement of students for a year after graduation.

Dissemination Plan

Throughout the project, the project leads will make it a priority to document project activities and results in such a way that others may adopt the CALL approach. Our dissemination plan consists of a multi-prong effort involving a variety of methods, participants, and venues:

(1) The project leads, all of whom are experienced presenters, will present insights and findings at major LIS-focused conferences, such as ALA, SLA, ALISE or ASIS&T. Papers will be submitted to peer-reviewed journals such as *College and Research Libraries*, *Journal of the*

Association for Information Science and Technology, *Library and Information Science Research*, *Journal of eScience Librarianship*, and the *Journal of Academic Librarianship*.

(2) Students will be strongly encouraged to develop their coursework and practica projects into publishable papers and presentations at similar venues to share their experiences. The project includes funding to attend at least one conference relevant to science or science liaison librarianship.

(3) At the beginning of the project, a project website will be created by the project manager and actively promoted to share activities and milestones. This website will be updated regularly throughout the project and beyond (as part of the UT-SIS and DU websites), to provide information about the curriculum, research and practicum experiences, and student accomplishments. News about the project will be posted to appropriate social and traditional media outlets. Findings and conclusions will also be linked via selected partners' websites.

(4) The summit on best practices for liaison librarianship, which will be planned and sponsored by UT personnel with the assistance of students and librarians, will highlight project results and suggest best practices for embedding liaison librarians within organizations of all kinds, with a focus on sharing the specific benefits attendees could potentially gain at their organizations.

(5) The PIs will use repositories such as GitHub and institutional repositories to share the curricular materials and insights developed through this project with the wider information science research community, so that other institutions may adopt the CALL model.

Sustainability

Both UT and DU will continue the CALL pathway and collaborations strengthened over the course of the project to educate liaison librarians for the future. In addition, the widespread dissemination of the curriculum, research experiences, and project results to the LIS and scientific communities will ensure that other libraries and schools of information science can use this project as a model to build in-house capacity. The carefully developed and tested coursework delivered during this project will continue to be built upon to educate future information professionals, and can serve as a guide for other educational institutions who wish to create similar coursework in the future. Because liaisons work in many different types and sizes of institutions, care will be made to ensure the materials developed from this project will be scalable according to the size and needs of any particular organization, and will be easily adaptable. The formative and summative evaluations will help ensure this goal will be reached. No restrictions will be placed on the use of the course or course content during or after the grant period. The curriculum and related materials will remain indefinitely on the project website and on shared repositories, and will continue to be updated and maintained well after the grant period.

3. Diversity Plan

Considering that recent evaluations have emphasized the continued lack of diversity in the library field (IMLS, 2017), the PIs place the utmost importance on recruiting a diverse cohort in order to build a representative, supportive professional network. Attention to diversity is particularly important as CALL prepares future information professionals to step into the highly collaborative roles of liaisons and team builders: these professionals will need the interpersonal skills and practical experience necessary to communicate and relate with people of all backgrounds and cultures. Future liaison librarians need to reflect the diversity represented in their academic and scientific colleagues and clientele. UT-SIS has an excellent track record of recruiting diverse cohorts for past projects, which have succeeded in placing students from different cultural, ethnic, economic, and educational backgrounds into the library and information sciences workforce.

This project will serve diverse communities in two ways. First, we will make the careful recruitment and selection of diverse students a high priority, paying attention to subject background, race, ethnicity, socioeconomic status, and geographic distribution, among other indicators. We will leverage our success

with past diversity-related projects while forming our recruitment techniques for CALL. Project PI's will work with our contacts from two Historically Black Colleges and Universities (HBCU's), North Carolina Central University and Clark Atlanta University, among other universities with a high percentage of minority students, to recruit students to the CALL project. Focus will be given not only to recruiting students with an LIS-related background, but students from a variety of undergraduate programs with emphasis on the STEM fields and social sciences. Additionally, we will work with the Office for Diversity and Inclusion at UT, which has resources in place to recruit recent diverse graduates from all types of educational backgrounds into graduate programs. We will also consult with the Student Success Center at UT, who have contact information for promising students from a number of different backgrounds, including those in the UT LEAD program who have been selected as diverse leaders in academic excellence. Finally, we will publicize the program to members of minority library organizations, who will be asked to identify potential recruits.

Second, project leads will focus a portion of the coursework and research experience activities specifically on serving diverse individuals and communities. For example, the Science Liaison Librarianship course developed during the first year of the project and implemented the second year will include a component specifically for working with diverse populations, particularly on the needs of ethnic minorities, immigrants, underserved communities, disabled individuals, and other segments of the population that need special consideration to ensure that their needs are successfully met. While working with their mentors at the science organizations, students will be encouraged to consider, discuss and implement ways to improve services for the different components of the diverse communities they serve. Liaison librarian activities have immense potential to identify and respond to the unique service needs of diverse populations, as well as identify perceptions, policies and attitudes that may impede successfully reaching out to these populations.

4. Broad Impact

Vast changes are occurring in the research environment as libraries and the organizations they serve evolve with the digital world. Today, librarians must continue to make use of new methods, technologies, skills, and team structures in order to reframe their work in the context of this transformed landscape, while at the same time reinforcing their roles as lifelong facilitators of information literacy and data skills (Peterson & Finnie, 2018; Rochenbach et al., 2018). This project will have current and sustainable significance as we build strategic collaborations and a model for liaison education that will serve as a template for future efforts to respond to and anticipate these transformations in the profession. CALL will have broad impacts for academic institutions as a whole as future librarians learn ways to engage communities, build curriculum for lifelong learning, and better position researchers for success in a changing research environment. Through the implementation of project activities and the sharing of the curriculum, a new generation of librarians will have direction and guidance in collaboration skills as they prepare to take their place as dedicated liaison librarians.

Past projects implemented by the project team have already been successful at placing many new library professionals in positions to help strengthen the diversity, scientific data skill set, and collaboration skills of the library profession. With a wealth of lessons learned from these successful projects and the help of an outside evaluator, project personnel will evaluate and assess the project at every stage. They will involve their excellent team of mentors and project partners in shaping the project as they learn the best methods for facilitating discovery and collaboration. Success in recruiting a diverse, intellectually robust cohort, high quality coursework performance and engaging research experiences, and successful relationships with mentors from the area science organizations will all be considered as markers of success. In addition, the PIs will track students following their graduation to ensure that they have been successfully placed in positions that allow them to use their unique set of skills as liaison librarians who will foster environments of discovery, critical thinking, communication and collaboration in a variety of agencies and organizations all over the country.

Collaborative Analysis Liaison Librarians (CALL) (Master's Level Project)

CALL YEAR 1 (2019-2020)

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Recruitment and admission of 1st cohort	▓	▓										
Planning mentorship and coursework	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
Hire Project Manager	▓											
Start project website	▓	▓										
1st cohort students meet with advisors to create their Individual Development Plans (IDPs)		▓	▓									
Job analyses of science liaison librarians and information needs			▓	▓	▓	▓						
1st cohort students take core required SIS courses (Fall 2019)			▓	▓	▓	▓	▓					
Development of Science Liaison Librarianship course			▓	▓				▓	▓	▓	▓	▓
1st cohort students take statistics/research courses/elective courses (Spring 2017)								▓	▓	▓	▓	▓
Meet with and recruit potential students for cohort 2				▓	▓	▓	▓	▓	▓	▓	▓	
1st cohort students travel to submit research at a conference										▓	▓	▓
Formative evaluation activities for Year 1											▓	▓
Complete Science Liaison Librarianship course development; send to consultant and senior personnel for input								▓	▓	▓	▓	▓

CALL YEAR 2 (2020-2021)

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Cohort 1 completes practica in science organizations		■	■	■	■	■	■	■	■	■	■	■
2nd cohort meets with advisors to develop Individual Development Plans	■	■	■									
2nd cohort meet with mentors to plan work experiences for the following year.							■	■	■	■		
Make adjustments to Science Liaison Librarianship course; complete course development	■	■	■	■	■	■						
Students take core required SIS courses (2nd cohort) and statistics/research methods/electives courses (1st cohort)			■	■	■	■						
Students take Science Liaison Librarianship course and statistics/research methods/elective courses							■	■	■	■	■	■
Monthly cohort building activities		■	■	■	■	■	■	■	■	■	■	■
Work Experience Evaluations						■					■	
Students travel to submit their research at conferences								■	■	■	■	■
Graduation for 1st cohort											■	
Exit interviews and job placement assessments for 1st cohort												■
Students meet with faculty to begin planning for the summit to be held in Fall 2021											■	■
Formative evaluations for Year 2 conducted											■	■

CALL YEAR 3 (2021-2022)

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
2nd cohort completes practica in science organizations		▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
Final plans in place for the summit	▓	▓	▓									
Summit on liaison librarianship held October 2021 in Knoxville or Oak Ridge				▓								
2nd cohort students take statistics/research methods/electives courses		▓	▓	▓	▓	▓	▓	▓	▓	▓		
Monthly cohort building activities		▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
Work Experience Evaluations						▓					▓	
Students travel to submit their research at conferences								▓	▓	▓	▓	▓
Graduation for 2nd cohort											▓	
Exit interviews and job placement assessments for 2nd cohort												▓
Students meet with faculty to begin planning for the summit to be held in Fall 2021									▓	▓	▓	▓
Formative evaluations for Year 3 conducted											▓	▓
Summative evaluations conducted											▓	▓
Reports prepared and turned into IMLS											▓	▓

DIGITAL PRODUCT FORM

Introduction

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (e.g., 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. 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

All applications must include a Digital Product Form.

> ☐ Please check here if you have reviewed Parts I, II, III, and IV below and you have determined that your proposal does NOT involve the creation of digital products (i.e., digital content, resources, assets, software, or datasets). You must still submit this Digital Product Form with your proposal even if you check this box, because this Digital Product Form is a Required Document.

If you ARE creating digital products, 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.

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.

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.

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 the format(s) you will use.

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.

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).

B. Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan. How will you monitor and evaluate your workflow and products?

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).

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).

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

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).

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).

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.

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?