Open Science Primer: Open Science Training for the Library Workforce
The Carnegie Mellon University (CMU) Libraries seeks $236,580 for a 3-year Laura Bush 21st Century Librarian (LB21) Implementation Grant for the development of a training program and curriculum to prepare library practitioners to meet the evolving Open Science needs and expectations of the research communities they support.

PROJECT JUSTIFICATION
The development of *Open Science Primer: Open Science Training for the Library Workforce*, will address LB21 Program Goal 3: *"Enhance the training and professional development of the library and archival workforce to meet the needs of their communities."* with primary Objective 3.4.

As researchers navigate emerging Open Science practices and mandates, libraries are evolving to support these changes across the research communities.[1] Various conversations demonstrate opportunities and areas for leadership that academic libraries have in Open Science.[2,3] The goal of the *Open Science Primer* project is to develop a "train the trainer" style certificate program that prepares academic libraries with the skills and expertise needed to support Open Science best practices, tools, and procedures at their institutions. The *Open Science Primer* primarily targets academic librarians and library staff, but is applicable to educators and others in research support positions.

Unlike most existing Open Science educational content, such as the Open Science MOOC or the FOSTER Open Science Toolkit, the *Open Science Primer* provides a "train the trainer" approach. The curriculum will align with the UNESCO Recommendation on Open Science and National Library of Medicine & National Institutes of Health report Developing the Librarian Workforce for Data Science and Open Science. The curriculum content will include traditional "open" topics, including fOpen Access methods, copyright, and FAIR data principles, as well as topics not yet commonly discussed in Open Science, such as open big data, open source software, linked open data, open metrics, and Open Science as it relates to Artificial Intelligence.

Open Science is a cornerstone of CMU Libraries' strategy and services: examples of infrastructure and programs include the Open Science and Data Collaboration Program and the new Open Source Programs Office. The project team is made up of a diverse group of CMU Libraries faculty and staff who provide Open Science related training, consultations, and resources and are active in Open Science related professional groups. CMU is positioned to develop a robust curriculum that will equip library practitioners and staff across various institutions

PROJECT WORK PLAN
Phase 1: Needs Assessment & Hiring (August 2023 - November 2023) - A *needs assessment* will be conducted to capture the Open Science topics, tools, and practices that library professionals need to understand in order to serve their research communities. The needs assessment will include a: scan of job postings in this area, review of selected library websites, survey of library professionals, and literature review, to identify curriculum needs.

During *Phase 1*, the project team will also hire a MLIS graduate student assistant to support the data collection and analysis for the needs assessment and to support the training development (see Budget Summary below for associated costs).

Phase 2: Program Development (December 2023 - April 2024) - The project team will use the results from the needs assessment findings to identify curriculum coverage and priorities. Components of curriculum development will be divided among the project team members according to their specialties. The project team will connect with their professional networks outside CMU for curriculum review and feedback, and welcome contributions.

This "train the trainer" style certificate program seeks to prepare the librarians across various types of institutions to support the Open Science demands of the research communities they support, including Open Access publishing, Open Data, Open Educational Resources, Open Peer Review, and Open Source Software. The *Open Science Primer* primarily targets academic librarians and staff who support researchers across all stages of the research lifecycle. The program will develop two versions of the curriculum: one to be delivered entirely online and one to be offered in-person over a 2-3 day period. Both the online version and components of the in-person version,

1 Tzanova Stefka. 'Changes in Academic Libraries in the Era of Open Science'. 1 Jan. 2020 : 281 – 299. https://content.iospress.com/articles/education-for-information/efi190259.

2 "Keeping Up With... Open Science", American Library Association, February 16, 2021. http://www.ala.org/acrl/publications/keeping_up_with/open_science.

3 Bueno de la Fuente, Ge Buma. "Libraries: Roles and Opportunities on Open Science." FOSTER, 2016,https://www.fosteropenscience.eu/content/libraries-roles-and-opportunities-open-science.

such as ancillary materials, will be hosted on Canvas, the CMU learning management system. Guest CMU Canvas accounts will be created for participants from outside of CMU.

Phase 3: Program delivery (May 2024 - August 2025) - The project team will facilitate 4 online and 6 in-person sessions. The project team will seek partners at institutions across the country to support the hosting of in-person training sessions. Partner institutions will include a variety of geographical locations and types (R1, small private, etc). Both the online and in-person training options will be free to participants and travel stipends will be offered for those seeking in-person training (see Budget Summary below for associated costs).

Phase 3 also includes the development of an assessment framework that academic libraries can use to assess the gaps in skills and understanding of Open Science principles, tools, and practice. This framework can also be used for individual assessment.

Phase 4: Evaluation and Dissemination (September 2025 - July 2026) - The training materials will be developed and shared following Open Educational Resources best practices and accessibility standards. Training materials will be shared on both Canvas Commons as well as in alternative formats on Open Science Framework. Findings from the needs assessment will be disseminated via publications and conference presentations (see Budget Summary below for associated costs). Conferences will include those specific to academic libraries, such as ALA & ACRL, as well as other disciplines with library tracks, such as the Engineering Libraries Division of the American Society of Engineering Education. *Phase 4* also includes the implementation and testing of the assessment framework outlined in *Phase 3*.

DIVERSITY PLAN
Diversity, equity, and access are at the heart of CMU Libraries and our Open Science efforts. To ensure our project is inclusive and open to all, we plan to engage with and recruit multiple perspectives from library and information practitioners in intersectional and multidisciplinary domains (i.e., HBCUs, Global South, Computing and Informatics, and K-12 educators) to learn where needs exist and to develop content that is accessible, universally understood, and can be easily shared.

PROJECT RESULTS
The core deliverables for the *Open Science Primer* are:1) an openly accessible, free curriculum on Open Science topics for librarians and library staff, 2) shared findings from our needs assessment to help direct the teaching of Open Science principles, which could support MLIS curriculum development, 3) a community of practice from the training participants, 4) an assessment framework to be used by academic libraries and individuals to assess understanding of Open Science principles, 5) publications which share the challenges, successes, and lessons learned in developing the curricula. Through these deliverables, this program will facilitate the growth and spread of experts and advocates of Open Science, across a variety of library communities.. Research communities will experience the benefits of this program as their libraries become increasingly prepared to interact in the Open Science ecosystem.

BUDGET SUMMARY
A total budget of $236,580 is requested over a three-year period (August 1, 2023 - July 31, 2026). The requested budget of $155,440 of direct costs and $81,140 of indirect costs following the CMU overhead rate of 52.2%.
Breakdown of direct costs
Graduate Assistant Wages: $37,440 total ($20/hour, for approximately 12 hours per week for 3 years)
In-person Workshops: $82,000 ($18,000 for workshop costs; $40,000 for instructor travel; $24,000 for participant travel stipends)
Conference Registration and Travel: $36,000 total ($3,000 per person, per conference)