Poets House Abstract

As the lead applicant for this National Leadership for Libraries project grant from the Institute for Museum and Libraries Services (IMLS), Poets House proposes a 3-year project, *Field Work: Poetry-Science Collaborations in Libraries and Museums*, that will: create a hybrid art-science program where STEM learning may be fostered more effectively through experiences using techniques and tactics that are formally a part of poetry and language arts; develop a model for cross-disciplinary collaboration between public libraries and natural history museums; and disseminate that model nationally. Poets House will work with the Milwaukee Public Library system and the Milwaukee Public Museum and the Salt Lake City Public Library system and the Natural History Museum of Utah. Both museums have significant natural history collections with robust public programming and both public library systems of both cities demonstrate dynamic public programming and community outreach capabilities.

Field Work addresses a number of national issues related to STEM, such as the need for: 1) librarians to receive in-person training, resource materials, and connections to STEM professionals in order to confidently implement STEM programming and create communities of practice; 2) "humanizing" of the language of science so that audiences can have more meaningful relationships with the natural history they encounter and scientists can reach a more general audience; and 3) interactive, hybrid art-science public program models that strengthen libraries as community anchors, create collaborations between different institutions and have the potential for national replication. By providing librarians with proper training and resources to work collaboratively, this project will increase the libraries' overall capacity, as well as their ability to facilitate STEM programming and foster STEM learning and provide new audiences for libraries and natural history museums.

The specific project activities, performance goals, outcomes, results and tangible products for the project are: 1) an initial gathering in Milwaukee of all institutions involved to create team building and discuss deliverables, followed by team work in each city leading to specific program plans; 2) implementation of joint public programs in each city; 3) development and installation of a "poetry path" through libraries, natural history museums and their surrounding local environments, accompanied by a digital app to extend the impact of the poetry path; and 4) a professional evaluation by NewKnowledge that will be made public for purposes of learning and national replication. In each city, a Poet-in-Residence with strong ties to the science community will work with the library and natural history center to determine the most appropriate local scientists and poets, facilitate the design of the joint public programs, and guide the poetry selections for the poetry paths, in consultation with all partners, including local communities.

Our audience, those we anticipate will attend the public programs and explore the poetry paths, include families with children, pre-K and elementary school children, middle school children, high school students, adults, senior citizens, as well as professionals in the fields of poetry/writing, science, and library science. We believe this project will result in increased visitor connection to the natural world and community engagement with local libraries, shifting public perception of libraries from passive centers of knowledge to active centers for learning and informal places for STEM learning. For librarians, natural history museum staff, scientists, poets, and other humanities experts participating in the project, we believe this will lead to: increased knowledge of and confidence in how to implement successful public programs and poetry-enhanced exhibits in libraries and natural history collections; increased knowledge of other fields—science and poetry—and their inter-relationship; and 3) stronger local partnerships between libraries and natural history museums and increased knowledge and expertise in inter-institutional collaboration.

Statement of National Need

Over the past decade, a national initiative to invest in STEM education has frequently been at the expense of the humanities, though much has been written about the need for STEM to work in concert with the humanities in order to create the kind of innovative, cross-disciplinary thinking necessary to address our incredibly complex world. Dr. Loretta Jackson-Hayes, associate professor of chemistry at Rhodes College, recently wrote in *The Washington Post* that the need isn't for more STEM majors, but for more STEM majors with liberal arts backgrounds. Former Cornell University president David J. Skorton argued that scientists are often unable to communicate effectively because "many of us never received education in the humanities or social sciences that would allow us to explain to nonscientists what we do and why it is important." ***The current project will: create a hybrid art-science program where STEM learning may be fostered more effectively through experiences using techniques and tactics that are formally a part of poetry and language arts; develop a model for cross-disciplinary collaboration between public libraries and natural history museums; and disseminate that model nationally.*** Poets House, a 70,000-volume poetry library and literary center, will work with libraries and natural history museums in Milwaukee, WI and Salt Lake City, UT to create community anchors that can provide families, students, children, senior citizens, as well as those in the fields of poetry, science, and library science, with multiple interactive entry points that will "humanize" the language of science, better enabling audiences to engage with science learning, and fostering lasting collaborations between libraries and natural history museums. As librarians shift away from their traditional support role to one in which they are equal thought-partners with fellow cultural institutions and active participants in programming and community engagement, this project will enable librarians to become better facilitators of STEM knowledge within their communities, while reaching thousands of people in each city.

This project, *Field Work: Poetry-Science Collaborations in Libraries and Natural History Museums*, falls under the **Community Anchor** category and aligns with IMLS Strategic Goals: 1) Foster learning in libraries; 2) Provide capacity and professional development in community anchor institutions: and 3) Support discovery of knowledge and cultural heritage in communities. It will create partnerships between the Milwaukee Public Library System and the Milwaukee Public Museum and the Salt Lake City Public Library System and the Natural History Museum of Utah to offer collaborative programs that will illuminate how poetry can support STEM learning. Poets House will host an initial gathering in Milwaukee of all institutions involved to create team building and discuss deliverables. This will be followed by implementation of joint public programs in each city; development and installation of a "poetry path" through libraries, natural history museums and their surrounding local environments; a digital app to extend the impact of the poetry path; and a professional evaluation by NewKnowledge that will be made public for purposes of learning and national replication. In each city, a Poet-in-Residence with strong ties to the science community will work with the library and natural history center to determine the most appropriate local scientists and poets, facilitate the design of the joint public programs, and guide the poetry selections for the poetry paths, in consultation with all partners, including local communities.

Through this collaborative effort, we believe the project will create greater engagement between scientists, poets, and librarians by providing those in the humanities with a deeper understanding of natural history and scientific ideas, and providing scientists with greater insight into the language of poetry and its approach to simultaneous intellectual and emotional learning. We anticipate that participants will discover synergies between the two fields and learn to more innovatively and accurately convey this information to the public. This sharing of knowledge and resources will also help to address the challenges faced by libraries as a result of federal, state and city funding cuts, providing both training and innovative programmatic resources.

Poetry & Natural History
Poetry and science have a long entwined history, going back to the sixth and fifth centuries B.C., when the Presocratics wrote about physics, chemistry, geology, astronomy, theology, metaphysics and epistemology in verse. Ruth Padel, poet and professor at King's College, London (and granddaughter of Charles Darwin) argued in *The Guardian* that science was born in poetry. The philosopher Lucretius from 1st Century B.C. wrote *De rerum natura* (On the Nature of Things),

an epic on physics and atoms, in poetry and metaphor. A collective movement to foster mutual understanding between the two fields can be traced to 1770, the beginning of the Romantic Age. Poets during this time (i.e. Shelley, Keats, Byron, Blake, Wordsworth and Coleridge) frequently made science a subject of their writing in attempts to reveal the "secrets of nature." And scientists were writing their scientific works in poetic form, including: *The Temple of Nature* by Erasmus Darwin, grandfather of Charles Darwin, a book of verse that outlined a theory of evolution,; astronomer Roger Boscovich's treatise on solar eclipses; and naturalist Rene-Richard Louis Castel's *The Plants: A Poem*. In 1777, writer and medical doctor John Aikin wrote *An Essay on the Application of Natural History to Poetry*, which argued for poets to acquire a substantial, accurate knowledge of natural history so that metaphors and images could be original, various and accurate, instead of work that was riddled with incorrect information or replete with "phraseology."

Theories abound as to the rift between science and the humanities: the move away from general knowledge towards specialization; rejection of explanatory poetry by the literary world; the speed with which scientific discoveries were being made; and the way that scientists were regarded—and regarded themselves—as experts whose field could only be explained using technical language. Technical language, however, without narrative or interpretive context can feel abstract to audiences outside the realm of science. Alison Hawthorne Deming, poet and Chair in Environment and Social Justice and Professor in Creative Writing at the University of Arizona, stated that "specialization within professional disciplines has made us less able to understand one another across the many divides, and the general public becomes less and less willing to try to understand what any of the experts are saying."

With the increasing degradation of the natural environment, it is more important than ever for everyone, especially the next generation of children and students, to care about the natural world. A recent scientificamerican.com blog stated that when "kids do not grow up around natural history, they become adults who are not only ignorant of natural history, but do not care about nature and view it as disposable and unimportant." The goal of this library-natural history museum project is to imbue visitors' experiences with meaning, deepening their connections to the natural world and greater understanding of the natural sciences.

Project History

This project is rooted in over 15 years of institutional experience with national collaborative projects in public libraries. Beginning in the late 1990's, at a time when poetry was culturally marginalized, Poets House developed the program Poetry in the Branches to work with branch libraries in the New York, Brooklyn and Queens systems to offer in-depth training, collection development, public programs for adults and teens, and publicity support. For many years, at the American Library Association's pre-conference events, Poets House provided technical assistance to libraries interested in turning community libraries into centers for the discovery of poetry. We published the *Poetry in the Branches Sourcebook*, a training manual for librarians, developed an annual National Institute, and collaborated with public libraries to offer public programs.

Field Work also builds on work that began with a successful 2004 collaboration with Central Park Zoo, placing poetry installations responding to specific scientific content throughout zoo exhibits with the goal of increasing understanding of the importance of conservation. Based on interviews with visitors conducted before and after the poetry installations, professional evaluators determined that interviewees were 35% more likely to include the value of conservation as an important aspect of the zoo's messaging, and 86% more likely to say that the zoo signage caused them to stop and reflect. That pilot collaboration led to Poets House receiving a National Leadership Grant from the IMLS for the *Language of Conservation* (LOC), which fostered partnerships between libraries and zoos in 5 cities (Brookfield, IL, Jacksonville, FL, Little Rock, AR, Milwaukee, WI, and New Orleans, LA). Poetry installations in the zoos were accompanied by public programs in the libraries. The poetry installations proved to be successful: 75% to 95% of zoo visitors reported having seen or read one or more of the poetry installations during their visit, and 82% to 91% of those who saw the poetry could identify a specific poem or recall a poetry location, demonstrating extremely high retention.

Language of Conservation (2009-2013) remains one of Poets House's most successful initiatives (for the full report, see LOC_13_Book.pdf). It presented 56 public programs offered by libraries alone or co-sponsored by zoos and was attended by 5,645 people. However, a few library partners, though pleased with the results of their own programming, felt that their role in the project was "less important" as a whole. *Field Work* seeks to retain the effective strategy of poetry installations, while equalizing the role of the libraries. This will be achieved in various ways: the initial gathering in Milwaukee will focus on shared goals between institutions; the poetry paths will be installed in both institutions or in neutral territory between the two institutions; libraries will be encouraged to take a leadership role in designing joint programming; and each city collaboration will be encouraged to promote all efforts jointly.

In 2015, the IMLS awarded Poets House a planning grant to explore possibilities for joint programming between libraries and natural history museums. The planning involved convening over 40 librarians, scientists, and poets to discuss collaboration between the fields (Hawthorne Deming was a key advisor). Participants concluded that a strategy based on smaller, more interactive programs, rather than the passive learning of large auditorium events, was the most effective way to deepen public experience of poetry and STEM learning.

The planning project also piloted a collaborative poetry-natural history program with Oakland Public Library and Oakland Museum of California. The compressed time frame of the planning period precluded an in-depth workshop bringing all partners together, ultimately reconfirming our experience from *Language of Conservation* that intense team building leading to shared goals and streamlined paths of communication between institutions is essential for a transformative success in a cross-disciplinary collaboration. Through the pilot project we determined that full-scale implementation should be limited to two cities with which we have deep ties in order for us to be intimately involved in the creation of a new model for science and literary learning and its national dissemination. The guidance of our stellar advisors enabled us to implement the planning project. We especially thank Sonnet Takahisa, from the Newark Museum; Kelly McKinley, from the Oakland Museum of Californina; and Mana Tominaga, from the Oakland Public Library.

Language & Science Learning
In the evaluation phase of LOC, interviews with zoo visitors revealed that many believed the poetry gave them a language to express what they felt but didn't know how to say. The unexpected poetic language at zoos offered emotional and psychological resonance to facts and fostered reflection on the part of the visitors. This type of reflection is critical to achieve the kind of interdisciplinary thinking that Dr. Jackson-Hayes discussed when she argued for more STEM majors with liberal arts backgrounds. This country, she believes, needs "nimble thinkers who know to consider [science's] impact on society and the environment."

Reflection and analysis, traits essential for studying and teaching science, are also at the heart of poetry. Both fields utilize highly specific language to examine the processes of life—the how and why—with different aims. By underscoring these fields' similar inquiry processes, we anticipate this project will be able to dismantle the perceived divide between the two fields by general audiences, librarians, as well as scientists and poets. In doing so, we hope to foster a common language that is also readily accessible to those outside the two fields.

Some scientists eschew the idea that a non-technical language, i.e. one that uses metaphor, can accurately convey scientific information to a general audience. But astrobiologist Dr. Caleb Scharf argues that metaphors, analogies, and similes are sometimes "the only way to build an intuition for a problem, by relating it to something else…We need structures…something to hang on to." Metaphors shape the way we see, imagine, and experience the world. Psychologists Paul Thibodeau and Lera Boroditsky stated in *Nature* that "far from being mere rhetorical flourishes, metaphors have profound influences on how we conceptualize and act with respect to important societal issues." Furthermore, poetry lends itself to appreciation for the natural world due to its ability to integrate direct observation and scientific fact with the imagistic language and metaphors that will simultaneously move and intellectually engage viewers.

Natural history collections play a vital role in our understanding of biodiversity, evolution, population genetics and the environmental impacts of climate change, which ranked 44 out of 100 in Aspen Institute's crowdsourced "What Every American Should Know" survey. With recent advancements in technology and media, scientists concerned with the human impact on biodiversity and the natural environment have been utilizing more innovative, dynamic visual presentations and creative language that make viewers feel emotionally connected to the scientific information, providing a more accessible, thought-provoking, and memorable experience. Creative language can also provide scientists with the vocabulary to turn facts into stories. Jonathan Olsen and Sarah Gross, teachers of an integrated science, humanities and technology program, wrote in *Scientific American* that "the importance of storytelling in science has been growing over the last few years as scientists work to communicate with the general public and stimulate more critical thinking about important issues."

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A number of recent study, "STEM in Libraries: National Survey Results," discussed how current STEM programs are already being integrated into literary and arts programming, with hands-on investigation, art-based projects, and STEM-related storytelling. The report also indicated librarians' stated need for training to effectively—and confidently—implement STEM programs. Included among librarian needs cited were: in-person training and how-to instructions for library professionals to provide STEM knowledge; connections between library professionals and STEM professionals; and assistance developing STEM programs. We believe this project addresses all those needs.

Leadership at the libraries and natural history museums in Salt Lake City and Milwaukee are deeply committed to this project and the prospect of collaborating with each other, Poets House and NewKnowledge. Both cities have excellent public library systems with proven capacity to support the work (Milwaukee Public Library was a *Language of Conservation* partner). The Natural History Museum of Utah and Milwaukee Public Museum are research facilities containing millions of objects and specimens; both museums are actively devoted to educating the public.

Working with these partners will allow us to develop a replicable community engagement model that unites science and the literary arts utilizing libraries and museums as community anchors. The two cities have key demographic similarities, as well as marked differences. Both cities have large populations of people under 18 and between 25-44; populations that are 50% religious; and small enclaves of refugees (in Salt Lake City, mainly Bosnian and Sri Lankan; in Milwaukee, Hmong, Somali and Burmese). Yet, the population size and racial makeup of the two cities differ vastly. The population of Salt Lake City is close to 600,000 people of which 75% are white, 17% Hispanic, 4% Asian and 3% black. While Milwaukee has a population of approximately 190,000 of which 39% are white, 39% black, 16% Hispanic and 4% Asian. Working with both systems will allow us to create models for larger vs. smaller cities and cities that are more homogenous vs. those that are more diverse.

PROJECT DESIGN

Field Work: Poetry-Science Collaborations in Libraries and Natural History Museums will be take place from July 2017 to June 2020 and will be divided into four stages: 1) Initial Gathering (late summer/early fall 2017) followed by team work in each city leading to specific program plans; 2) Public Programming (spring 2018 – spring 2019); 3) Poetry Paths in each city with accompanying digital app (planning begins spring 2018; production January 2019; completion April 2019); and 4) Evaluation & Dissemination (July 2019 – June 2020). The Poets-in-Residence, who will guide and facilitate each city's efforts, have already been selected.

Field Work has five main goals, to: 1) deepen capacity at community anchors by strengthening programming in libraries and museums, creating pathways between institutions; 2) provide librarians with resources to become better facilitators of STEM knowledge; 3) "humanize" the language of science via poetry so that audiences can forge deeper, more meaningful relationships with the natural history they encounter; 4) further activate and articulate the role of libraries as active partners with other cultural institutions in community learning; and 5) create a proven hybrid poetry-science model for national replication.

Our audience, those we anticipate will attend the public programs and explore the poetry paths, include families with children, pre-K and elementary school children, middle school children, high school students, adults, senior citizens, as well as professionals in the fields of poetry/writing, science, and library science. Their active participation will be discussed in "Public Programs."

We believe that by bringing together libraries and natural history centers and providing them with appropriate training and resources, this project will facilitate STEM programming and increase capacity at each institution. The project will also develop a new model that brings science and humanities learning together at public institutions; develop new evaluatory tools; and build mechanisms to facilitate national collaborations between libraries and sister cultural organizations. We anticipate *Field Work* will result in:

- Stronger local partnerships between libraries and natural history museums in Salt Lake City and Milwaukee;
- Increased community engagement with local libraries, shifting public perception of libraries from passive centers of knowledge to active centers for learning and informal places for STEM learning;
- Increased confidence among librarians regarding their skills and abilities to facilitate STEM learning via new or enhanced relationships with local scientists;
- New audiences for libraries and natural history museums; and
- A tested hybrid poetry-science public program model for national replication.

The design of this project assumes that common goals can be created between institutions and that the fields of natural history and poetry desire a common language. One of the biggest risks in the project, which our work plan seeks to mitigate, is the lack of comfort and familiarity—or intimidation—that librarians might feel around science and that scientists may have around the poetry. The issues of intimidation in regard to poetry or science are not found solely among the professionals but also among audience members. This project addresses that intimidation directly through interactive hands-on public programs that utilize both the language of science and language of poetry at both the natural history museums and libraries. Poet and professor Alison Hawthorne Deming wrote, "Poetry deepens and enriches the concepts of science, bringing emotional and psychological resonance to facts. Poetry fosters reflection and empathy thereby exploring the ethical dimensions of science and technology. Fresh language encourages asking novel questions, conceiving new ideas, discovering unexpected relationships between fact and experience that can lead to innovative solutions or means of communication." All participants come away with a greater sense of their own capacity to engage in both arenas.

Another area of concern is the danger that professionals in one institution may not feel empowered to engage as an equal thought partner with professionals in the other. We are addressing this directly through constant dialogue among all institutions throughout the course of the project and careful balancing of all project goals, resources and deliverables in the project design.

We are requesting IMLS funding of $249,619 for this three-year project. The overall budget is $364,288, which included $114,669 in cost sharing from Poets House, the libraries and natural history museums. Key project members include (please see bios and resumes for experience): *Poets House*: Lee Briccetti (Executive Director) and Jane Preston (Managing Director) will provide strategic oversight of the project; Stephen Motika (Artistic Director) will oversee artistic outputs and Reggie Harris (Director of Library and Outreach Services, who also has experience conducting workshops for seniors and teens) will act as Project Manager and will manage regular communications and coordination, and oversee the day-to-day activities; *NewKnowledge*: John Fraser, Principal, will oversee theoretical underpinnings of the evaluation and, together with Rebecca Norlander will evaluate the project; and *Poets-in-Residence:* Alison Hawthorne and Katharine Coles (see below, "Poets-in-Residence" section, for bios). Poets House will also involve our Director of Children's Programs throughout the course of the project. Key members will work with collaborating partners in city teams: Paula Kiely (Milwaukee City Librarian) and Dennis Kois (President, Milwaukee Public Museum) in Milwaukee, and Colleen McLaughlin (Manager of Public Programs, Natural History Museum of Utah) and Tommy Hamby (Adult

Services Coordinator, Salt Lake City Public Library) in Salt Lake City and programmatic staff in both cities, especially those focused on adults, children and teens, families and seniors. Advisors include Dan Wharton and Sandra Alcosser (see PartnerBios).

Poets-in-Residence
The role of the Poet-in-Residence is to work with Poets House, library and museum professionals in each city, and local science and poetry communities to plan poetry programs, select poetry for the installations (poetry paths) and act as a liaison between the institutions and other community groups. They will integrate the strengths of the diverse institutions, interact with all communities, and advocate for this project on a local and national level. The Poets-in-Residence were selected based upon their national literary and academic reputations, deep knowledge of science and natural history and extensive experience working with projects that bring together poetry and science.

- *Alison Hawthorne Deming* is assigned to Milwaukee, WI. She is the award-winning author of 9 books of poetry and 4 nonfiction books, including a collaboration with Stephen Strom, a renowned professor of astrophysics. In her writing, she explores the relationship between human life, imagination and nature, focusing on the physical universe and animal extinction. She was lead Poet-in-Residence and spokesperson for Poets House's *Language of Conservation*, a program featuring environmental-themed poetry installations and poetry programs in zoos and public libraries in 5 cities that aimed to deepen understanding of the natural world and environmental science.
- *Katharine Coles* will be in Salt Lake City, Utah. Residing in Utah, she is the author of 6 books of poetry and fiction, as well as editor of *Blueprints: Bringing Poetry into Communities*. Her recent poetry collection *The Earth Is Not Flat* was written under the auspices of the U.S. National Science Foundation's Antarctic Artists and Writers Program. She also co-directs the Utah Symposium in Science and Literature with mathematician and biologist Fred Alder. In collaborative classes on science and literature, she worked with Adler to teach students how to explore metaphors in scientific language; develop objective, observational skills in doing research for poems; and test out experiments in poetic language that echo experimental science practices in applying rule-based systems for producing poems.

Initial Gathering of All Project Participants
According to "STEM in Libraries: National Survey Results," librarians prioritized their need for in-person training for STEM programming. While face-to-face trainings and discussions have been standard practice for Poets House partnerships, in light of this finding, we believe our in-person training and team-building is more critical than ever.

Prior to the initial gathering, participants will receive a toolkit, which will serve as a foundation for the intellectual and programmatic capital developed through the project. A major deliverable of *Language of Conservation,* the toolkit was applied and revised for the library-natural history collaborative planning project. It will be further applied and revised at the start of this project—and will continue to be refined throughout the project. The toolkit will include: a review of project goals and design; tipsheets on collaborative STEM programming; a detailed how-to on presenting public poetry programs in libraries and community settings; biographies of all participants/attendees and description of project roles; detailed timelines; lists of program examples; marketing materials to optimally present programs to different audiences; bibliography; project budgets with instructions for drawing down funds; and evaluatory tools such as audience surveys.

The initial gathering will take place in Milwaukee in late summer/early fall of 2017. Poets House and NewKnowledge will work together to provide representatives from Milwaukee Public Library System, Milwaukee Public Museum, Salt Lake City Public Library System, Natural History Museum of Utah, and the two Poets-in-Residence with an immersive experience in team building, technical assistance, discussion of logistics, deliverables and metrics. Our past experience demonstrated that when all partners have the chance to meet and discuss the project in person it forges a sense of community, common purpose, shared confidence and enthusiasm for the initiative.

Public Programs
Local project teams in each city will present six public programs, for a total of 12 public programs. Public programs will explore the localities and geographies of each city, as well as the resource materials within each institution. Through

highly interactive, thought-provoking and fun activities blending natural history and poetry, we believe the public programs will engage families with children, pre-K and elementary school children, middle and high school students, adults, senior citizens, as well as professionals in the fields of writing, science, and library science.

For Field Work program audiences, STEM learning will not be a rehearsal of facts but an engagement with an ongoing orientation toward collaborative thinking, questioning and reasoning. In keeping with STEM learning goals, program components focus on real world issues and "the engineering design process" of exercises that focus on real world problems while seeking creative, collaborative solutions via hands-on experiences integrating literature with science investigations.

Initial conversations with the Poets-in-Residence enabled us to outline a few initial program concepts (below). All public programs will include activities that will allow audiences to engage with the poetry and science and envision themselves as authors and scientists. However, individual institutions will determine their program offerings in consultation in consultation with the Poets-in-Residence and in dialogue with the full city team. The exact nature of each collaboration, and whether programs will be offered jointly, or co-promoted, will be determined locally.

Salt Lake City, Utah
- Nature walks at the Natural History Museum of Utah (NHMU) and Salt Lake City Public Library with staff scientists and poets, resulting in writing exercises in which participants describe what they have perceived in scientific and poetic language.
- Walks around the vicinities at both NHMU and The Salt Lake City Public Library where Stephen Goldsmith and his students bring "buried nature" (creeks, etc.) above ground again and restore ecosystems within the urban space, with similar writing exercises.
- Walks around the vicinities at both NHMU and The Salt Lake City Public Library with indigenous tribes to learn about their perspectives and ways of understanding landscape.

Milwaukee, Wisconsin
- Milwaukee Riverwalk: a guided walk with a poet and science educator. Riffing on Langston Hughes "A Negro Speaks of Rivers" writing exercise using language from poetry and science. "I've known rivers." What are the ways of knowing that science gives us? What does poetry give us? Other art forms?
- Urban Animals: guided walk at Natural History Museum with poet and biologist. Look at Bishop's "The Fish" and "The Moose." Choose an animal in the museum exhibit and write a poem in the voice of that animal. Must use at least three science facts and three metaphors.
- Animal Encounters in the Library: working from memory, write about an animal encounter you've had. Mix in some science research and elements from pop culture, mythology, film or religion. Graze through books in search of surprising images, language, metaphors.
- Sense of Place Map: draw a map of your neighborhood or city noting the places where you have a relationship with nature. Write a poem about urban nature based on this.

Through physical interaction with the local environments and active participation, we believe observation-based exercises and experiences will help participants better understand the world around them. These exercises will also generate potential material from local communities for the poetry paths and digital app.

Additionally, the library systems and natural history museums of Milwaukee and Salt Lake City, Poets-in-Residence, and Poets House will work with the institutions' educational networks, in addition to school networks and neighborhood and community associations to reach as many children, teens and families as possible. We anticipate this project will reach at least 10,000 children, teens and families in each city.

Poetry Paths & Digital App

To deepen visitors' interactive experience with humanities and science learning, significantly widen audiences exposed to the project, and extend its life, we will create poetry paths throughout the libraries and natural history museums—and looping through the local environments surrounding them, which will be accompanied by a digital app. The poetry paths will be located at each institution and their surroundings. Each path will feature installations of poetry signage alongside scientific information. Under the guidance of Poets House, the poetry and science text selections will be determined by the local project teams guided by the Poets-in-Residence, who will also incorporate feedback and ideas from the local communities. For example, poetry generated during the public program writing exercises will be included in the proposed texts for signage, and the libraries and museums may invite visitors to submit text selections and potential sites, or vote on certain texts. The number of signs at each library or natural history museum will be determined following the design assessment of each institution and a series of discussions.

The digital app will feature: a map of the path at each site; text of poems and science facts installed on signage; full poems and fuller science information; user ability to forward lines of text via social media; interactive games and writing exercises; and a way to connect with the library or museum to provide feedback on the project. We will intentionally offer a beta version of the app so that users can help us to shape the final design and content of the app, thereby fostering more interaction and engagement. We will also use a special project-based, native and web building platform so that we do not need to develop software. The platform company will also provide us with maintenance and technical assistance for manageable implementation of the app. (For more information please see DigitalProduct form.)

Evaluation

Evaluation will be led by NewKnowledge Organization (NewKnowledge), a leading think tank collaborating with cultural associations on strategies for assessing collective impacts. New Knowledge has led all Poets House studies related to poetry and science learning, including the planning study on which this project is based. As both museum and library researchers, they understand both types of informal learning centers and the training needs to support effective evaluation. NewKnowledge staff will work under the direction of John Fraser, PhD AIA. Dr. Fraser will be supported by Rebecca Norlander, PhD, an expert in using digital communication tools for education and in the development of conflict resolution theory. Dr. Norlander will lead site coordination, serve as coach for the data collection teams, and manage qualitative analysis and synthesis reporting. Tools that align with IMLS's performance measure statements will focus on both quantitative indicators, where scale of encounter can offer insight into programs, and qualitative measures that can offer explanatory evidence of types of experience outcome. (See EvaluationStrategy for further information.) The evaluation team will be available to provide supplementary online training and coaching over the life of the program delivery. The aspiration is to create an embedded evaluation program that uses visitor experience, activity, and opportunities to share their own perspectives on the experience as a data aggregation strategy. Research data will be preserved by NewKnowledge and available for access by the research community.

Evaluation Strategy

This project occurs at the intersection of humanities experiences and STEM learning in natural history museums and public libraries. Generally, all natural history museums embrace anthropological research for both its scientific learning and to advance humanities reasoning in relation to cultural evolution and cross-cultural learning. The two institutional partners on this project recognize the value of creating hybrid programs where STEM learning may be fostered more effectively through experiences that use techniques and tactics that are formally part of poetry and language arts. The definition of science reasoning has been explored extensively as part of museum family conversation studiesand through exploring online discourses. In most cases, these studies and the frameworks they support have been developed based on intergenerational learning with children as the target. Children are a substantial part of the learning experience, but this project seeks to explore learning among *all* visitors, including adults choosing to engage in the informal learning setting. Our evaluation strategy is structured to uncover the STEM learning processes instigated through encounters with poetry and curated humanities programming that leverages informal STEM learning in natural history museums and public libraries. The strategies for assessing impacts of poetry installations were developed and refined through

Language of Conservation. These proven techniques and tactics for integrating observation, intercept interviews, staff surveys, and information tracking will be adapted to the settings for this project. This evaluation will explore different types of poetry experiences that more effectively lead to:

1. Perception of the self as a capable STEM learner;
2. Change in perceived relevance of STEM natural history information to the learner's life;
3. Engagement in analogic modeling or appraisal of a phenomenon instigated by the juxtaposition of curated poetry and scientific information display or pursued in conversations from poet/scientist collaborations; and
4. Effectiveness and efficiency measures of approaches that can most efficiently replicate these results in other museum/library/scholar collaborations or coalitions (dynamic organisms working toward a common goal).

Examples of questions for visitors may include: "What did the science facts at this location (where poetry extract is placed on the path) make you think about?" and "Which passage in this text was particularly meaningful to you? What might this passage lead you to discuss with others?" Questions to ascertain institutional impacts will be drawn from the critical reflection prompts requested of all organization's leadership team, their administrators, and educators or volunteers. Examples include: "Since recent installations of text curated by a poet in collaboration with curators were recently revealed at your site, how do you feel this text impacts your work? The visitor experience? How new exhibits might leverage humanities programs to advance STEM learning goals?"

A report of program outcomes for each site will guide the development of the final permanent installation. Once the poetry paths are complete, data collection will be gathered via quantitative and qualitative surveys before and after installation of the pathways to assess impacts and outcomes of poetry experiences on science reasoning, as well as to discern which aspects of the installation were most relevant to provoking STEM learning processes.

Evaluation Training
Initial gathering in Milwaukee, WI in late summer/early fall 2017: NewKnowledge leads an evaluation workshop with all partners to identify principles and evidence opportunities relevant to the programming and installations, strategies and methods that can be deployed at all proposed program sites. The evaluation workshop will be filmed and distributed to all partners, then posted for free to the web to serve as a tutorial on how to conduct an evaluation.
Follow-up evaluation workshop in Milwaukee and Salt Lake City prior to the start of the public programs: Researchers will conduct one-day evaluation workshops in each city order to assess and finalize all evaluation tools. The workshop will include a volunteer training workshop to support the data-collection strategy once the programs launch.

Evaluation tools include: program outputs; visitor surveys; reflective journals by program leaders and staff observing the programs; leadership and site partner records; observation tools deployed through volunteer data collectors; videos for talks and public dialogues; transcripts from presentations; and user online digital sharing.

Our evaluation will consider the perspectives of stakeholder groups in isolation (the libraries, the museum, and the poet) and in combination. For this effort, the evaluators will engage in a participatory action research approach, involving an iterative learning process where all stakeholders at both sites collaborate to shape the project's course, progress, assessment, and co-development of metrics and datasets with the evaluators. Participatory approaches are used to increase programmatic learning by all participants, create shared ownership of the program, and offer insight into the most effective operational conditions as program evaluation data. These results in turn facilitate consensus building and ownership of evaluation findings and conclusions, and increase likelihood of recommendation adoption that can sustain a program after the funding ends.

National Impact & Dissemination

Field Work addresses a number of national issues related to STEM, such as the need for: 1) librarians to receive in-person training, resource materials, and connections to STEM professionals in order to confidently implement STEM

programming and create communities of practice; 2) "humanizing" of the language of science so that audiences can have more meaningful relationships with the natural history they encounter and scientists can reach a more general audience; and 3) interactive, hybrid art-science public program models that strengthen libraries as community anchors, create collaborations between different institutions and have the potential for national replication. By providing librarians with proper training and resources to work collaboratively, this project will increase the libraries' overall capacity, as well as their ability to facilitate STEM programming and foster STEM learning and provide new audiences for libraries and natural history museums.

This project will produce/offer the library field:
- A series of public programs and interactive hands-on activities in Salt Lake City and Milwaukee that utilize the language of science and poetry to create community engagement and foster STEM learning / Provides a detailed plan on how to run such programs;
- Resources/toolkit (referenced earlier) for libraries, natural history museums and unrelated cultural institutions interested in creating hybrid interdisciplinary models / Evidence-based deliverable with proven results;
- Series of in-person trainings for creating STEM-focused public programs using the arts as an entry point / Evidence for the value of in-person training and the value of collaborative institutional partners in order to foster STEM programming and learning;
- Poetry paths that explore the institutional sites and accompanying digital app / How-to plan on creating a poetry path in a library or natural history museum and nuts-and-bolts of creating a companion digital app;
- Video of the initial evaluation workshop for public access / Tutorial on how to conduct an evaluation; and
- Process and findings white paper on the entire project, detailing the programmatic and institutional balance between the libraries and natural history museums; the effectiveness of the poet residencies; whether the institutions felt the collaborations were productive and successful; the skills the librarians developed through this process; institutional and public reaction to the co-created programming and poetry paths; whether visitors felt more deeply engaged with issues of natural history and why; and the impact of this project on the institutions / Detailed guidebook and replicating a project of this scope and scale.

We will collect and report data in order to achieve IMLS's performance measurement statements through professional evaluations; solicitation of direct feedback from institutions and communities before, during and after the project; and exit surveys via in-person and online, sign-in/comment books, and social media posts.

This IMLS grant will allow us to spearhead a community engagement model that will provide library professionals with new skills in collaborating with other cultural organizations and new capacities to engage as equals in the exploration and presentation of new forms of public presentation and dialogue, addressing their shifting role in society. It will also unite science and literary arts by enabling libraries and museums to be community anchors, leading to new cross-disciplinary/institutional learning and new dialogues with local communities and visitors. It will also enable science centers to learn how to partner with libraries. We anticipate providing hundreds of librarians greater expertise in facilitating STEM learning through dissemination efforts that will include: 1) development of a new module to be published in *Poetry in the Branches Sourcebook* (available on-line); STEM-focused Poetry in the Branches National Institute (2 day intensive training, Poets House, Sept 2019) and webinar; article publication in *Library Journal*, if accepted; presentations at professional conferences including: Public Library Association (Nashville, February 2020); Associated Writing Programs (March 2020); American Library Association (Chicago, June 2020); and Metro (NYC, January 2020). Our evaluation team will present the final reports and survey tools through the CAISE website at InformalScience.org and, if accepted, present results at the annual American Alliance of Museums conference following the conclusion of the work.

FIELD WORK:
POETRY-SCIENCE COLLABORATIONS IN LIBRARIES AND NATURAL HISTORY MUSEUMS

TIME FRAME	ACTIVITY

July 2017 – Feb 2018	**July – September, 2017**
	• Contracts and Letters of Agreement
	• Preparation and scheduling for Initial gathering
	• Evaluatory tools developed by New Knowledge
	• Monthly conference calls with Poets House, Milwaukee Public Library System, Milwaukee Public Museum, Salt Lake City Public Library System, Natural History Museum of Utah, New Knowledge, poets-in-residence of each city, and project advisors
	• Initial gathering in Milwaukee between Poets House, Milwaukee Public Library System, Milwaukee Public Museum, Salt Lake City Public Library System, Natural History Museum of Utah, New Knowledge and poets-in-residence of each city for team building, to discuss project goals, provide technical assistance, and discuss deliverables and metrics
	    o Evaluation workshop will be filmed and distributed among the participants and will serve as an online tutorial on how to conduct an evaluation
	
	October – December, 2017
	• Scheduling of city-wide team meetings in Milwaukee and Salt Lake City
	• Scheduling of additional meetings between Poets-in-Residence and members of each team
	    o Travel plan for Milwaukee's Poet-in-Residence
	• Monthly conference calls between Poets House, Poets-in-Residence, library and museum partners
	• Posting of Evaluation Workshop Video
	• Development of smaller teams in each institution and among institutions
	• Development of city-specific collaboration plan
	• Discussion of/planning for 6 programs in each city, which may be individually or co-sponsored
	• Initial discussion of potential poetry paths in each institution in each city and how they will link up with public programs and existing programming at each institution
	• Discussion of methods for identifying and including underrepresented local communities at the libraries and natural history museums
	• Discussion of outreach plan for elementary, middle and high school students
	• December – Preliminary programming, outreach & marketing plans due from each institution
	
	January – February, 2017
	• Monthly conference calls between Poets House, Poets-in-Residence, library and museum partners
	• On-going planning meetings in each city and with Poets-in-Residence
	• Firming up of program plans; scheduling
	• Development of outreach plans
	• Scheduling of Follow-up Evaluation Workshops in Salt Lake City and Milwaukee
	• February – Final programming, outreach & marketing plans due to Poets House
	    – Follow-Up Evaluation Workshops take place

	FIELD WORK: **POETRY-SCIENCE COLLABORATIONS IN LIBRARIES AND NATURAL HISTORY MUSEUMS**
March 2018 – May 2019	- Monthly conference call with key staff members of each institution - Monthly meetings continue in each city - Marketing materials for public programs created and disseminated - Planning for development of poetry paths begins - Programming begins in each city - Feedback gathered from visitors and participants - Locations for poetry paths in each institution finalized - Poetry selected for poetry paths in each institution by Poet-in-Residence in collaboration with librarians, natural history museum staff, poet-in-residence, and local communities - Development of digital app for poetry paths begin - Production of poetry paths begins (January 2019) - Digital app finalized (February 2019) - Poetry paths open (April 2019) - Completion of 6 public programs in each city (May 2019)
July 2019 – June 2020	**Summer** - Evaluation completed; - STEM focused Poetry in the Branches Sourcebook module completed - Outreach for STEM focused Poetry in the Branches National Institute - Plans/outreach for conference presentations and articles **Fall** - STEM focused Poetry in the Branches National Institute at Poets House (September) - White paper prepared **Spring** - Metro (January) - PLA (February) - AWP Conference (March) **June** - ALA Conference - All deliverables completed - Project concludes

Digital Product Form

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.

> *The original content of the poetry path apps will belong to Poets House and its partners. Permission for its use must be obtained in advance through a non-restrictive Creative Commons license.*

> *Copyright for all artistic content will be held by poets and/or their publishers, from whom we will have gained permission for our use. Copyright and permission status will be published on the app.*

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.

> *With the exclusion of the poetry, content will be considered available for all "Fair use" educational purposes.*

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.

> *Poets House will contact copyright holders for permission to publish all non-original work.*

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.

> *Digital content will include maps of two poetry paths, text of poems used along the paths, biographies of poets, and information about participating organizations.*

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.

> *Existing computers equipped with standard office software, printers, Epson 1100XI scanner used for creation of written material (poems, bios, etc.) and maps.*

> *Software used to develop the poetry path app is a product available from OnCell (1160D Pittsford-Victor Road, Pittsford, NY 14534 (585-419-9844), www.oncell.com*

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).

> *Maps will be scanned minimum 300 dpi, in both TIFF and JPEG formats*

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).

> *Coordination of materials and work of poets and partnering institutions overseen by Poets House Project Manager. Workflow will be monitored via regularly scheduled conference calls with Poet-in-Residence and project teams in both cities. Technical issues will be resolved through meetings/discussions between app creator OnCell and Poets House staff. Artistic quality will be overseen by Poets House Artistic Director and final products will be approved by Executive Director before release.*

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).

> *All digital assets will be preserved on Poets House institutional servers.*

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).

Descriptive metadata will be created by Poets House library staff using MARC, in consultation and conjunction with project's institutional partners.

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

Metadata shared with partner libraries will be preserved by all.

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).

Metadata shared with partner institutions. Digital assets added to the Poets House catalog and added to OCLC.

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).

Digital content available to the public via the newly created app (iOS and Android compatible). Can also be made available online via project-dedicated website.

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.

www.poetshouse.org
Poets House Website

http://poets.kohalibrary.com/cgi-bin/koha/opac-main.pl
Poets House Library Catalog, including metadata for more than 70,000 items

http://poeticvoicesofthemuslimworld.org/
Project-specific website