

**FULL PROPOSAL ABSTRACT, NARRATIVE, AND
SCHEDULE OF COMPLETION**

Syracuse University's School of Information Studies (iSchool) is partnering with Coulter Library at Onondaga Community College (OCC) and Fayetteville Free Library (FFL, an Onondaga County public library) to respond to the National Leadership Grants for Libraries (NLG) Program, addressing IMLS's *Learning Spaces in Libraries* priority. This project can best be summarized as: the community is the collection. We propose to design a Community Profile System to include human expertise, particularly in the STEM fields. This system will enable librarians to collect communities' learning needs, identify relevant community experts, and link the resources to serve the learning needs in a cost efficient manner.

The tangible products include the Community Profile System and its web and mobile applications (e.g., available to iPhone and Android phone users). There will be three major types of users, e.g., community experts, patrons, and librarians, and they can use either type of application (web or mobile). For example, community experts may want to volunteer to share their knowledge, expertise, and time in different library services, such as *human library* events or *makerspaces* programs. They can enter their expertise, interests, availability and preferred interaction methods (face to face meetups or emails) to the system. Patrons may use the system to express their learning needs and interests, and about the kind of community members they prefer to meet up with for certain learning outcomes. Librarians may facilitate the data input by community members, review collected profile data, approve the content, and use the community profile information to organize future library services and events. It is possible that librarians may need to contact both volunteers and patrons regarding their profile, and the same community member may enter information both as an expert volunteer and as a patron. The deliverables of the project will also include documentation on how to leverage the system to enabling different community-oriented services in different settings.

To accomplish the goal, this 3-year project will perform four major activities: 1) assess community members' learning needs and identify community experts' interests and their availability in participating different libraries' services via survey and interview studies; 2) build data models that capture the various needs and dynamic people resources as collection; 3) develop a workflow by identifying librarians' roles in data collection, organization and validation; 4) prototype and implement the system with user interactions and privacy protection features, as well as evaluate the system prototype via system pilot study and diverse test cases.

This project proposes timely research for community building. Libraries are shifting their focus from a predominantly collection-driven approach to a predominantly community-driven focus. Ideas of centering librarians' work on community development have been discussed in work such as *The Atlas of New Librarianship* by co-PI David Lankes and have seen wide adoption through ongoing efforts such as the American Library Association's Libraries Transforming Communities and even in IMLS's new strategic areas. Learning is an active process and so is driven by the community, not by collections. However, while there is wide-spread acceptance of the idea of community-oriented librarianship, there are far fewer tools to help librarians implement these ideas. Thus, the system we are building will realize community-oriented librarianship in a cost-efficient manner.

The two partnering libraries, Coulter Library and FFL are selected based on their great success in providing different community-oriented library services. Their librarians and systems administrators will work closely with the iSchool team through the whole project. Additionally, Central NY Library Resources Council (CLRC), librarians from Bird Library at Syracuse University, and faculty members from iSchool will also serve as advisory board members for this project. The collaboration and partnerships will ensure the design, test, and assessment of the tool to meet its goal of a national adoption in diverse settings once it completes the prototyping phase and moves to the production phase.

Community as Collection: Building the Community Profile System

Syracuse University's School of Information Studies (iSchool) is partnering with Coulter Library at Onondaga Community College (OCC) and Fayetteville Free Library (FFL - an Onondaga county public library) to respond to the National Leadership Grants for Libraries (NLG) Program, addressing IMLS's *Learning Spaces in Libraries* priority. This project can best be summarized as: the community is the collection. We propose to design a Community Profile System to expand library collections to include human expertise, particularly in the STEM fields. This system will enable librarians to collect communities' learning needs, identify relevant community experts, and link the resources to serve the learning needs in a cost-efficient manner. This 3-year project will accomplish four activities: 1) assess community members' learning needs and identify community experts' interests and their availability in participating different libraries' services through survey and interview studies; 2) build data models that capture the various needs and dynamic people resources as collection; 3) develop a workflow by identifying librarians' roles in data collection, organization, and validation; 4) prototype and implement the system with user interactions and privacy protection features, as well as evaluate the system prototype via a system pilot study and diverse test cases.

This project proposes a timely research for community building. Libraries are shifting their focus from a predominantly collection-driven approach to a predominantly community-driven focus. Ideas of centering librarians' work on community development have been discussed in work such as *The Atlas of New Librarianship* (Lankes 2011) by co-PI David Lankes, and have seen wide adoption through ongoing efforts such as the American Library Association's Libraries Transforming Communities, and even in IMLS's new strategic areas. Learning is an active process and so is driven by the community (Chudolinska 2014), not by collections. However, while there is wide-spread acceptance of the idea of community-oriented librarianship, there are far fewer tools to help librarians implement these ideas. Thus, the system we are building will realize community-oriented librarianship in a cost-efficient manner.

The iSchool offers a great platform to lead this partnership, because the project will be conducted by a team with complementary expertise and a successful track record in collaborating with librarians. In early 2014, PI Yun Huang collaborated with 6 libraries (including a university library, a community college library and a few local public libraries in Upstate New York) and built a system to promote their library events, which includes both a web application for librarians to enter data and a mobile application for patrons to use and access event information (both available in Apple Store and Android Google Play). Later, when the River Campus Libraries at the University of Rochester organized similar library events, they reached out to Dr. Huang with a request to use the system, and were quite satisfied with it. In this project, we continue our partnership with selected libraries, and invite librarians from other libraries to co-design the system. The SU iSchool is a leading center for innovative programs and interdisciplinary research in information systems. The project will be conducted in the PI's research lab (<http://salt.ischool.syr.edu>), where we can acquire insights and feedback from our lab members and advisory board members (who are prominent researchers) regarding a variety of topics, such as privacy and security, information policy, and human computer interaction. The established collaborations will provide an ideal platform to promote the adoption of the proposed system in different libraries once the prototyping phase is completed and the project moves to the production phase.

The two partnering libraries were selected based on their great success in providing different community-oriented library services. Coulter Library at OCC is a strong practice-oriented partner with experience in organizing community social learning events and integrating library services strategically with class curriculums at OCC. FFL, a public library, is known for its distinct role in leading the makerspace movement. Their librarians and systems administrators will work closely with the iSchool team through the whole project. Additionally, the Central NY Library Resources Council (CLRC), librarians from Bird Library at Syracuse University and faculty from the iSchool will serve as advisory board members for this project. These collaborations and partnerships will ensure that the design, testing, and assessment of the tool will meet its goal of national adoption in diverse settings.

Statement of Need

Libraries have always been about learning, as seen in the history of libraries' support for the earliest universities, to the progressive movement of the 19th century that pushed for public schools and public libraries, to the more recent shift in focus of all libraries from collections and tools to communities and participation.

Librarians are re-embracing learning and communities (Singh & Ovsak 2013). Learning is an active process and so is driven by the community member, not by collections. It has become clear in the past decade that librarians must see their communities as assets and aspirations, not problems that can be addressed by tools such as books, databases, and a collection. Even in academic libraries we see statements such as "Collections are no longer the defining feature of libraries" (Marcum 2015). However, while there is wide-spread acceptance of the idea of community-oriented librarianship, there are far fewer tools to help librarians implement these ideas. The rallying cry of "the community is your collection" has been met with a hodgepodge of programs. Some have gained national attention such as the work of the Fayetteville Free Library in makerspaces or the work of Chattanooga Public Library's 4th floor (Ishizuka 2015; Berry 2015) – these tend to be the result of heroic people rather than systematic planning and implementation. Some programs have been widely implemented such as Skype Author visits to school libraries or Human Libraries, where local experts are offered to a community as "Human Books." These human books can be checked out for short conversations. However, these programs are points in time, and don't necessarily lead to continued involvement of community experts in the library.

Librarians are being stretched thin as many local, state, and federal agencies are seeking to reduce costs by reducing or eliminating public services. Where a citizen could once talk to a tax specialist at the IRS, now they are only offered access to frequently asked questions and forms online. This year the IRS didn't even budget enough funds to provide printed forms through libraries to citizens with no access to the Internet or no Internet skills. To be clear, the way the IRS currently seeks to support citizens with no access to the Internet is to provide forms on the Internet! This has resulted in librarians increasingly called upon to provide support of citizen tax filings. Librarians are expected to be STEM educators, tax experts, employment counselors, pre-literacy instructors, and managers of core library services. Such new expectations must be backed with an increase in library STEM support to prepare librarians for the task.

The solution to increased STEM activity and learning of all types in libraries is in realizing that public libraries, and the librarians that make them work, need to radically change their view of the communities they reside within (Lankes 2011; Kern 2014; Wentz 2012). Rather than look at the community as a group to be served (supplied access to a collection, taught to read, etc.), librarians must see their communities as their true collection. Communities have in their numbers tax experts, scientists, writers, historians, and much more. The result of using the community as the collection puts the librarians in a position of comfort, builds on resident expertise, and ultimately results in a greater culture of STEM throughout the community. The expert receives recognition and the reward of a public good. The community member gains access to expertise (from an expert that normally has a passion for the topic) and the library builds a stronger connection to the community.

Creating tools for sustained engagement of community expertise as part of library services is crucial for the ongoing well-being of libraries. Moving a community from a "service population" that "votes" to a true participant in the library is more than outreach, or advocacy. It is crucial for the survival of libraries as we see the shrinking of the public sphere and the off-loading of citizen learning to libraries of all types (Jaeger et al. 2014). For example, in academic libraries, faculty are often the best source to answer student questions. Yet librarians need means of identifying faculty willing to share that expertise, and understand how to work with faculty without overloading them. This project will work to understand faculty incentives for participation, as well as technological means of managing that participation. This project ultimately seeks to expand the idea of collection development to human expertise.

Traditional library collection development encompasses selecting, acquiring, organizing, and circulating books and materials. These same "meta" skills (locating, organizing, preparing, providing access) can be applied to the community itself. Librarians across the country are seeking out expertise in their own

School of Information Studies, Syracuse University

communities, but is it efficient to ask librarians to go out and accrue people resources individually? With the increasing popularity of crowdsourcing, and crowdsourcing approaches that have been applied in the library service domain (Peet 2015), we observe a great opportunity to develop a Community Profile System by using crowdsourcing approaches. Because the goal is to connect people together, safety and privacy could be one of the major concerns, thus librarians play an important role in connecting them as a mediator. With the proposed system, librarians do not need to worry about where to find the people, instead they can concentrate on how to connect people or how to organize learning events according to the various backgrounds and dynamic availabilities of the collections. For example, once they identify experts, they work to provide that expertise to the rest of the community. Here is a professor of physics, maybe she can do a lecture. Here is the local science teacher, who has no time to lecture, but can create kits with an oscilloscope, a book on energy, and a lesson plan that a parent can use with his or her child.

We propose to build a tool that provides infrastructure support to seamlessly incorporate community members into the services and collections of libraries. This will be done by building a Community Profile System to enable the creation of a community expertise network with an emphasis on community members with STEM knowledge.

Anticipated Impact

By building an infrastructure to help librarians weave together expertise from communities, libraries can be better positioned to aid in STEM education, community development, and the advancing of community aspirations. The true outcomes of this work are to provide valid working tools to tightly tie community expertise with the library and to highlight the importance of librarians as facilitators. Real tools will speed adoption of the library as a learning platform model and make the concept of community as collection real. Libraries therefore enable the expansion of learning spaces for the local community in a cost-efficient manner.

First, the Community Profile System supports learning beyond the current skills of library staff. The current mode of library services is to have librarians master a topic and plan programs for a community. This means that the best services offered by the library will center on the existing skills of the library staff. This desire for control by librarians comes from the mythology within the field that librarians can be generalist and support learning in any context. This model only works when the generalist skills of librarians are tightly coupled with the knowledge of content experts. The system will ease the connection between librarians and content experts allowing the librarian to focus on facilitating learning and allowing the expert to focus on what they know.

Second, the system builds a network of community supporters for the library. Using a library, and being part of a library are different. Many people use the library to learn. However, this learning rarely leads directly to new library services, or directly benefits the community. By making community expertise part of the library, mediated by community profiles, experts will feel they are a part of the library, and learners will not only get better content, but a community link. This process can weave the experts and learners of the community together with the library playing an essential part in this community fabric.

Thirdly, the system enables a more diverse and flexible social learning environment by collecting community learning needs and making them easily accessible. Teens and college students are obsessed with social media, and they learn through media, such as videos and online games. They no longer read books as much as people did before (Ludden 2014; Moyer 2011), and young people may not feel like going to libraries. Thus, many libraries organize social learning events (Bryant 2009), e.g., learning by gaming at Coulter library and making at FLL, to demonstrate to youths that libraries are fun places, that they can learn through different social learning interactions and activities that are more engaging, adventurous, and effective than videos or online games. The Community Profile System will not only collect learning resources, but also will capture a variety of learning needs identified by the librarians.

Project Design and Evaluation

The system will help librarians to identify learning needs and capture the expertise of community members,

School of Information Studies, Syracuse University

effectively utilize the community profiles to organize events and develop ongoing relationships, as well as host a variety of community-driven programming.

The goal of this proposed project is 1) to understand how to develop and use the collections of human expertise, 2) to build a technology infrastructure to support the development of such collections and to aid in the process and provision of materials to ease adoption of the concept and system by librarians, and 3) to evaluate the usefulness and impact of human expertise collections and tools. The deliverables of the project will also include a design of the system workflow, a data model, user interaction designs of the system, and documentation on how to leverage the system to enable different community-oriented services. Given that staff capacity, local cultural norms, or other factors (i.e., vetting of resources, liability) vary from library to library, we will create a series of flexible protocols for libraries to understand how the Community Profile System might be implemented in various ways and utilized in different settings.

Building partnerships with communities

Partnering with local libraries and librarians is key for this proposed project to successfully accomplish its goal and deliver the products. The partnerships will be built through two venues:

Advisory Board

Our project team has faculty from interdisciplinary backgrounds, such as library science, information systems, and computing science. We also reached out to librarians and researchers to serve on the advisory board. Together, their domain expertise and extensive experience will provide valuable advice to the team to ensure success in accomplishing the proposed tasks. The following individuals have all agreed to serve on the advisory board and facilitate connections for other community members to be involved in this project.

- Members from participating libraries, who will work closely with the team and provide input and guidance on designing the system based on their expertise and experiences.
 - **Susan Considine**, Executive Director, Fayetteville Free Library (FFL), an Onondaga county public library. As an administrator of a busy, progressive public library, Susan has facilitated the development and deployment of the talented FFL team that created and implemented the first openly accessible makerspace in a public library in the U.S., the FFL FabLab, <http://fflib.org/make/fab-lab>. She has successfully recruited and developed a team of dynamic professionals, support staff and community members who offer cutting edge library services and transformative opportunities in a state-of-the-art physical and virtual environment. She believes that making, participatory hands on learning and natural opportunities for connecting and conversation all build community.
 - **Pauline Shostack**, Director, Coulter Library, Onondaga Community College (OCC). Pauline is a Professor and Library Department Chair of Coulter Library at Onondaga Community College. Pauline has been a librarian for over 17 years and has worked in a variety of libraries throughout the country. In her current position she is responsible for overseeing the library department, as well as organizing and developing Coulter Library's web presence. Her current areas of research focus on community-building through play, interpersonal activities, and social media. She also has developed several strategies that successfully engage community members to participate Coulter Library's social learning events.
- Members from a local library council, SU Bird Library, and the iSchool faculty. They will lend their vision, range of experience, and extensive expertise in librarian leadership to our team, and provide insights on how to design a privacy-preserving system, as well as test the tool in different library settings.
 - **Debby Emerson**, Executive Director, Central NY Library Resources Council (CLRC). Debby has worked in libraries for over 30 years and has experience in both public and academic libraries. In her current position as director of a multi-type library system, she sees library

School of Information Studies, Syracuse University

services from a broad perspective and enjoys working with all types of libraries to facilitate cooperation and collaborative projects. Under Debby's leadership, CLRC coordinated the New York Libraries booth at the New York State Fair in 2014 and will do so again in 2015. CLRC also helped several Central NY libraries plan and implement their Human Library events in April 2014 and April 2015. Debby serves the library community as Vice-President/President-Elect of the New York Library Association.

- **Abby Kasowitz-Scheer**, Learning Commons Librarian, Syracuse University Libraries. Abby provides reference, instruction and outreach services and organizes special events for the Syracuse University community, including an annual Human Library.
- **Dr. Barbara Stripling**, Senior Associate Dean, the School of Information Studies, Syracuse University. Dr. Stripling was the 2013-2014 President of the American Library Association. As director of school library programs in New York City, with 1.1 million students and 1700 schools, Dr. Stripling used her leadership skills to focus on building a nurturing and supportive community and strong guidance for all the school librarians.
- **Dr. Yang Wang**, Assistant Professor, the School of Information Studies, Syracuse University. Dr. Wang's interests focus on privacy and security, social computing, and public policy issues, especially those regarding privacy. His work has been featured in national magazines and media outlets, such as the *New York Times*, *Wall Street Journal*, *Forbes*, *IEEE Spectrum* and *Washington Post*. PI Yun Huang and Prof. Wang co-direct the SALT lab (<http://salt.ischool.syr.edu>). Thus, team and students will have access to all the researchers and resources provided by the lab.

Two Exemplar Libraries as Partners

We will collaborate with one community college library (Coulter Library) and one public library (FFL) to design, implement and evaluate the tool.

The community college environment is a great starting point for the project. First, unlike big university libraries, community college libraries do not have many departments or complicated organizational layers. Our first priority is to implement the tool through case studies. The lightweight organization of a community college library allows us to focus on addressing key issues involved with the core features of the systems, the primary workflow of handling the community profile data and user interactions with the system. Secondly, even though community college libraries mainly serve students, faculty, and staff, issues in authentication by college accounts, accountability safety, and privacy are as challenging as those in a public library setting. Thirdly, based on the data from the Center for Community College Student Engagement, 58% of students at community colleges are taught by part-time faculty (Fain, 2014). Many of the part-time faculty live in the community and may have full-time jobs in varying positions. They are great resources, directly connecting students to broader learning areas outside of the campus. The community college is a small mirror of the general public community in that neighborhood.

In recent years, making has been captured by popular media as it is creating significant public benefits. An increasing number of libraries create makerspaces. Building these makerspaces and making them alive requires knowledge of their local communities, their interests, strengths, and needs. FFL has been making rapid progress on this movement. We believe building this tool with FFL can advance a deeper understanding of how to design making practices, and how to engage community members more effectively.

In brief, understanding the design challenges and evaluating the system with one community college and one public library will help us to address the challenges of larger academic and public libraries in general.

Community Profile System

The work builds off of three pre-existing bodies of work: community-focused librarianship (often referred to as "New Librarianship"), *Human Library* Events, and multi-platform applications developed to support local knowledge sharing with librarians serving as the central hub. In this section, we first present how we are

School of Information Studies, Syracuse University

inspired to conduct this research, and then propose the tasks we will accomplish in a 3-year timeline. Because we will apply iterative design methodology, each year's tasks may involve user study, system design, implementation, and evaluation using different materials. All the activities will contribute to or produce related publications and involve outreach events.

Inspiration from the Human Library Events and Our Prior System Development Process

Human Library, originally developed outside of libraries (Human-Library, 2000), is now a unique library service that promotes local knowledge sharing and collaboration. Unlike using physical library resources in traditional services, patrons interact with "human books" (people who volunteer to share their experience or expertise) for a wide variety purposes. Human books are volunteers who contribute their knowledge and time to the service.

In 2014, we collaborated with two academic and four Central New York local public libraries to develop a system that includes multiple types of devices and across varying platforms to facilitate and promote their human library events. Human books sent their book titles and brief book descriptions to librarians, and librarians input the book information into our system. Then patrons could review the book information using our mobile apps, available on both Android and iPhone platforms. These one-time human library events have proven successful. Both the human books and patrons enjoyed and welcome more events.

Building on past projects to support human libraries, research into librarians as facilitators of learning, ongoing research in virtual reference networks, and a variety of social learning events organized by libraries, we envision a human library infrastructure that is based upon a crowdsourcing platform. We propose to develop a Community Profile System, using technology, that can incorporate the "human books" and community demands of these books into the library collection in a cost-efficient manner, such that the human library can be available on a daily basis.

We stress that even though we received inspiration from the human library events, the Community Profile System will not be limited only by offering human library services. Given our collaboration with FFL and Coulter Library's hosting of "How To... Festival" and DIY/Maker areas, we will design the system to serve the needs of a variety of community-oriented services provided by our partner libraries. We will also constantly seek feedback and input from our advisory board on our design, and how it can be more flexible and adaptable to a broader context. Thus, the proposed research tasks below are designed to be conducted in a wide area of services and will be evaluated in different settings.

Our experience in past human library work shows that reliance on librarians to reach out to individual community members and request profile information is not be scalable and efficient. Given the huge success of crowdsourcing in many different application domains (Mun 2009, Geiger 2011, Tiramisu 2011), we propose to design the system by applying crowdsourcing techniques. Crowdsourcing is a scalable and efficient approach to enable the distribution of data collection to every community member. However, crowdsourcing systems also have well-known issues, such as how to bootstrap the system and encourage users to make contributions? The first seems not a very difficult question in this case, because librarians can help identify the first group of patron users to bootstrap the system. In addition, we also need to address following questions: what community profiles should, can, and need to be collected? How are collections of community profiles best built, represented, and managed? How can a safe and flexible process of interacting with community members be assured? How can practitioners use the profiles to facilitate different community-oriented library services? Finally, how do librarians interact with the community and use the system? Below we propose the four major tasks with detailed activities that will help us address the abovementioned questions.

Task 1: Understanding Prospective Users' Needs

We will first gain deeper understanding of community needs by providing two case scenarios: human library events and makerspaces. For example, through surveying human library event participants and interviewing event organizers, we gained an initial understanding of why people created human books and why people

School of Information Studies, Syracuse University

checked out certain books (Jackson & Huang, 2015). However, these were built upon a really small sample of the community. Based on the initial understanding of the research space, we will develop a more comprehensive survey and user interview tools to further understand the needs of large numbers of prospective users. For example, what are volunteers' intrinsic desires in making contributions? Why do people volunteer and why don't they? Do they have concerns with time commitment? If they serve as human books, do they have questions they won't answer? What are their security and privacy concerns? What are their preferred approaches to address these concerns? For example, people may prefer to be available for a particular period of time, and may prefer face-to-face meetups or emails. All the questions can be asked in a similar way to the patrons who want to "check out" human books. In case of makerspaces, questions to be asked include: What leads people to attend making activities? What do they prefer to learn, and what did they learn? With whom do they want to make things? What is the different learning outcome between experienced makers and novice makers? Do they want to make things together?

Given Coulter Library has hosted continually successful human libraries events for the past three years with hundreds of participants, we will be able to study the libraries who organized the events and their participants through surveys and interviews, and conduct our studies with live events. In FFL, we may focus on the questions in the context of makerspaces. We will gain deeper understanding of (1) the challenges of providing services that involve community members from librarians' perspectives, (2) motivation, difficulty or concerns of creating community profile from volunteers' perspectives, and (3) motivations and expectations of using different community-oriented services from community members' perspectives.

Task 2: Data Model - Organizing and Linking Community Profile Collections

Understanding users' needs and concerns will provide us insight into the design and help us to identify functional requirements of the system with profile creation, sharing, and indexing. Data solutions that can help collect, model, and present community profile information will address these questions: What is involved in each profile? How does it connect with other community profiles? How is it linked with other resources that can facilitate librarians to promote its connections? Which part of the data needs to be visible to the general public? What level of access controls need to be built?

In particular, community as collection implies two essential components: community and collection. Community consists of individual members. Members of a community can be represented by multiple attributes such as expertise, experience, and occupation. A set of attributes form a profile for an individual member in a community. It is possible that a member may be active in several communities. For example, a person who is a faculty member has a profile based on his or her institutional role, which makes him/her a member of his/her institutional community. Meanwhile, the same person may also be an active member of a local historical society or library book club. This multidimensional nature of community member profiles requires the representation of community members to be portable, linkable, and device neutral to allow for reuse and interoperability of such profiles. This means that once the metadata for an individual or organization is created, it should be reusable on mobile devices and/or personal computers and communicable between different systems for community profile management applications.

A portable representation in metadata refers to the ability of semantic terms (elements and value spaces) in a metadata schema to be reused in different contexts (Qin & Li 2013). For the proposed project, it is essential to model the attributes of community as collection in smaller modules, with rich relationships to enable reuse of content and interoperability between different types of devices and systems (e.g., library catalogs). At the center of this portable representation approach is the application of ontological modeling that will define classes of concepts, properties, and relationships that characterize community as collection at individual, organizational, and group levels. Existing metadata terms in standards will be incorporated whenever possible. Essential entities in this model will include person, institution, context, topic category, topic term, and location, among others. Relationships between entities and lists of topic categories and terms will also be identified and encoded in multiple formats, which can be published as Linked Data for sharing and reuse.

School of Information Studies, Syracuse University

Task 3: Workflow & User Interaction Design

What should be the protocol to make connections between community members? Based on results from Tasks 1 and 2, we will design a workflow and paper prototype of the system, and conduct studies to evaluate the design.

A high-level model of the crowdsourcing system involves three types of users, i.e., volunteers, patrons with various learning needs, and librarians. For example, the system will provide an interface for community volunteers, who may be domain experts, to enter their interests and expertise; before the collected information is available to patrons, librarians will serve as mediators. Depending on input data, librarians may need to approve collected information and use the information to match expert volunteers with the patrons who have the needs. The system will also provide an interface for patrons to enter their learning needs, interests, and availability for different events. The same community member may enter information both as an expert volunteer and as a patron. Our studies of the previous human library events showed that during the readings, human books might also discover something new in their lives (Jackson & Huang, 2015). Thus, we may also design features that can help volunteers better learn about themselves when they are serving others' learning needs (e.g., being read by others as human books). We may explore the possibility for implementing functions that allow recording book readings and explore the opportunity and effect of sharing human book reading experience on human libraries. The recordings must be agreed on by both parties beforehand, and there will be questions about who can access them and where they will be stored. Functions that can be helpful for analyzing the reading process will also be implemented. Similarly, videos may be captured for makers upon their requests, and the videos can be used to review the learning and making processes. Because location matters, we will further enable location-based community profile search and reservation services in a safe and flexible manner.

One of the goals of the system is also to develop an algorithm to translate librarians' knowledge and experience of their experience into the system, such that recommendations can be made to facilitate event organization. The system may also implement a feature that allows librarians to keep track of the past events' records easily. So that there will be a statistical analysis dashboard for them to optimize the scheduling of the future events.

We plan to design paper prototypes of different user interactions, and run paper prototype studies to evaluate the design using the System Usability Scale (SUS) form. Paper prototype studies can ensure design usability and reveal more user needs during the interviews (Tan & Huang 2015).

Task 4: System Implementation and Pilot Study

Similar to what we did with the initial human library system, we will implement a multi-platform Community Profile System. We expect users to use the Community Profile System primarily through desktop PCs and web browsers. However, we also plan to provide mobile applications for users to access the system anytime at anywhere with location-enabled features.

The system implementation will apply the generic waterfall model used in software development processes. While the process is to flow smoothly downwards to the final release, steps in analysis, design, implementation, and testing will be iteratively executed to ensure the quality and usability of the system design.

In addition to the paper prototype evaluation, after implementing the system, we will run a two-month field trial study, which includes analyzing real user logs, and interviewing participants. We will develop system tests and evaluate the overall performance of the key functions using the Technology Acceptance Model (TAM) model. Based on the field trial feedback, we will revise the system design and implement new functions.

The success of the system can be measured using different metrics. For example, we can show real user traffic to the system and interview their frequencies of using library services before and after system launch. We expect more visitors to the library, and an increasing number of events scheduled by the system. The enlarged community profile database can also serve as evidence of the adoption of the system by librarians. We believe after the first two years' close collaboration with libraries, current services may evolve and new metrics can be identified to evaluate and show the effectiveness of the system.

All the test cases will be co-designed with our partner libraries and will be consulted with our advisory

School of Information Studies, Syracuse University

board members. For example, OCC has several classes that participate in their Human Library events. Participant activities can lead to simple extra credit given for checking a out a human book or class credit for giving a speech in class. The following classes have participated in events over the years: Public Speaking, Psychology of Women, English as a Second Language, Interpersonal Communication, Human Adjustment, and Freshman Seminar. Some of the assignments were to write a reflective essay regarding their check out, giving a speech in public speaking class, and completing a question sheet with answers given by their Human Book. They also had one class that provided the option for students to be human books. Students that selected this option had to meet with a librarian, write their book title and summary, participate in a mock human library checkout, be a human book at an event for a minimum of three hours, and write an essay about the experience. We may recruit students and faculty from these classes as our participants to interview their library service usage. When we run field studies at FFL, because makerspaces offer different programs to different age groups, we will develop different sets of interview protocols and IRB applications accordingly.

Diversity Plan

Two of this project's PIs are female STEM faculty. The PhD student who has already been involved in this project comes from an underrepresented group. We will continue encouraging women and minority students to participate in the proposed project activities. The iSchool has made great efforts to support minority groups, such as BLISTS (Black and Latino Information Studies), and women (WIT: Woman in Technology), and we will work with them in recruiting student researchers and ensuring equal participation in the project.

Additionally, in general, community college students come from diverse backgrounds with a wide range of ages. New immigrants from various countries go to community colleges as their first college after moving to the United States. According to the Education Longitudinal Study (ELS: 2002-06), 44% of low-income students attend community colleges after graduating from high school; and 38% of students whose parents did not graduate from college choose community colleges as their first institution (CCRC, 2014). Therefore, we expect our participants from OCC will have diverse backgrounds.

Project Resources

Timeline

We have a detailed action plan in a three-year agenda, provided in the Schedule of Completion. Given the PI's prior research and system implementation experience, the proposed work will be finished within the timeline. The iSchool team and Coulter Library partner have developed initial survey protocols to understand users' needs (Jackson & Huang 2015). The IRB application for that study has already been approved. The survey protocols for the new user studies will need finalizing, and we will develop additional interview protocols for the three different study stages, i.e., initial stage prior to designing the system, after the prototype design is finished, and in field trials after the system is implemented. The PhD student who is budgeted in this project will conduct all tasks in this category, including running the user studies, collecting results, and writing reports. We will consult with our advisory board members frequently to report our progress and seek feedback on our results and on improving the system design. The PI's team has developed and released other production systems, on the market. The proposed plan was based on this past experience and on the past performance of the student team. We have a well-established team programming environment in place, including version control software, a ticketing system, a server setup protocol, code review and release practices.

Budget

- One hourly PhD student will be hired for each project year (10 hours/week, 50 weeks) to design and carry out the user study research, and will contribute to paper writings and reporting.
- In year 1, one master student will be hired to work on system workflow and user interaction design (10 hours/week, 48 weeks). In year 2, three master students are budgeted to program the system backend for the iPhone app and the Android app. Each student is budgeted for 10 hours/week during the academic year and 30 hours/week during the summer. In Year 3, three master students will work 12 months (10

School of Information Studies, Syracuse University

hours) to finish the applications, revise the applications based on user study results, test performance, facilitate field study and data collection, and deploy the three applications.

- Funding for PIs to disseminate the work at conferences.
- Compensation for personnel time and effort at the partner sites.
- Support for PIs leading the research and development activities.

Personnel

The diverse expertise of the team members ensures the necessary knowledge, skill, and experience for achieving the proposed research goal.

Dr. Yun Huang, PI, builds systems as vehicles for conducting her research. To date, she has built and deployed several production systems and open software applications through collaboration with different stakeholders, including: Tiramisu (Huang et al. 2015; Tiramisu 2011; Tomasic et al. 2014; Zimmerman et al. 2011), SU DPS (DPS 2014; Tan et al. 2015; Huang 2015), Emotion Map (EmotionMap 2015; Huang & Tang 2015), Human Library (Jackson & Huang 2015; Web app 2014; iPhoneApp 2014; AndroidApp 2014) and CAN (Composable Accessibility Infrastructure) (Huang & Dobreski 2015; Chrome 2014). The Tiramisu System also won an Intelligent Transit System award. She conducts system research through a combination of empirical, theoretical, and technical research efforts. Her systems research has yielded several publications in premier HCI conferences such as CHI and CSCW. She will provide the technical vision and expertise to build the infrastructure and tools that libraries can incorporate to implement the vision of the community as collection.

Dr. R. David Lankes, Co-PI, and author of the aforementioned *Atlas*, will be the primary contact with the libraries who will partner with Syracuse University in this project. He will contribute his background in incorporating community expertise into library services and systems. *The Atlas of New Librarianship* won the 2012 ABC-CLIO/Greenwood Award for the Best Book in Library Literature.

Dr. Jian Qin, Co-PI, will contribute her expertise in data management and information organization to link community expertise into a rich tableau of published resources and available library and non-library services. Dr. Qin also has been leading the effort to build an eScience librarianship curriculum, will contribute her expertise in data management and information organization to link community expertise with community learning needs. Her current grant, NSF ACI-1443047, “CIF21 DIBBs: Domain-aware management of heterogeneous workflows: Active data management for gravitational-wave science workflows” (current PI Duncan Brown), October 2014–September 2017, \$900,000, is to develop data infrastructure building blocks needed to allow large groups of collaborating scientists to discover, share, reuse, annotate, and verify the complete results of large-scale, distributed, and heterogeneous workflows.

Communications Plan

Disseminating our results is a critical step to share our experience and make a broader impact in the LIS as well as the STEM communities, particularly in education. A project website will be created and highlighted in broad community-focused librarianship efforts such as the *New Librarianship* and *Expect More* activities. The work will be submitted to conferences such as ACRL and ASIS&T, as well as to CSCW and CHI, where we believe our interdisciplinary research will draw the attention of researchers from other disciplines. We will also spread the word about the project through the iSchool’s rich network of library science students, alumni, and affiliated libraries.

Sustainability

We will provide comprehensive documents to support the continuing development of the system and its applications as an open sourced project on GIT hub (<https://github.com/>). The mobile apps will also be freely available in the Apple Store and on Google Play. The iSchool of Syracuse University provides server and storage resource for research projects, and will cover necessary fees for keeping mobile applications online. The fees include a \$99/year annual payment for releasing multiple iPhone apps using the same iSchool itunes connect account, and one time payment of \$25 for releasing one Android app. Three PI’s mobile projects (including web apps, iPhone and Android apps) have received the same support for keeping them online in the past three years.

DIGITAL STEWARDSHIP SUPPLEMENTARY INFORMATION FORM

Introduction:

IMLS is committed to expanding public access to IMLS-funded research, data and other digital products: the assets you create with IMLS funding require careful stewardship to protect and enhance their value. They should be freely and readily available for use and re-use by libraries, archives, museums and the public. Applying these principles to the development of digital products is not straightforward; because technology is dynamic and because we do not want to inhibit innovation, IMLS does not want to prescribe set standards and best practices that would certainly become quickly outdated. Instead, IMLS defines the outcomes your projects should achieve in a series of questions; your answers are used by IMLS staff and by expert peer reviewers to evaluate your proposal; and they will play a critical role in determining whether your grant will be funded. Together, your answers will comprise the basis for a work plan for your project, as they will address all the major components of the development process.

Instructions:

If you propose to create any type of digital product as part of your proposal, you must complete this form. IMLS defines digital products very broadly. If you are developing anything through the use of information technology – e.g., digital collections, web resources, metadata, software, data– you should assume that you need to complete this form.

Please indicate which of the following digital products you will create or collect during your project.

Check all that apply:

Every proposal creating a digital product should complete ...	Part I
If your project will create or collect ...	Then you should complete ...
<input type="checkbox"/> Digital content	Part II
<input type="checkbox"/> New software tools or applications	Part III
<input type="checkbox"/> A digital research dataset	Part IV

PART I.

A. Copyright and Intellectual Property Rights

We expect applicants to make federally funded work products widely available and usable through strategies such as publishing in open-access journals, depositing works in institutional or discipline-based repositories, and using non-restrictive licenses such as a Creative Commons license.

A.1 What will be the copyright or intellectual property status of the content you intend to create? Will you assign a Creative Commons license to the content? If so, which license will it be? <http://us.creativecommons.org/>

A.2 What ownership rights will your organization assert over the new digital content, and what conditions will you impose on access and use? Explain any terms of access and conditions of use, why they are justifiable, and how you will notify potential users of the digital resources.

A.3 Will you create any content or products which may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities? If so, please describe the issues and how you plan to address them.

Part II: Projects Creating Digital Content

A. Creating New Digital Content

A.1 Describe the digital content you will create and the quantities of each type and format you will use.

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

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

B. Digital Workflow and Asset Maintenance/Preservation

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

B.2 Describe your plan for preserving and maintaining digital assets during and after the grant period (e.g., storage systems, shared repositories, technical documentation, migration planning, commitment of organizational funding for these purposes). Please note: Storage and publication after the end of the grant period may be an allowable cost.

C. Metadata

C.1 Describe how you will produce metadata (e.g., technical, descriptive, administrative, preservation). 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 and/or collected during your project and after the grant period.

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content created during your project (e.g., an Advanced Programming Interface, contributions to the DPLA or other support to allow batch queries and retrieval of metadata).

D. Access and Use

D.1 Describe how you will make the digital content 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 URL(s) for any examples of previous digital collections or content your organization has created.

Part III. Projects Creating New Software Tools or Applications

A. General Information

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

A.2 List other existing digital tools that wholly or partially perform the same functions, and explain how the tool or system you will create is different.

B. Technical Information

B.1 List the programming languages, platforms, software, or other applications you will use to create your new digital content.

B.2 Describe how the intended software or system will extend or interoperate with other existing software applications or systems.

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

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

B.5 Provide URL(s) for examples of any previous software tools or systems your organization has created.

C. Access and Use

C.1 We expect applicants seeking federal funds for software or system development to develop and release these products as open source software. What ownership rights will your organization assert over the new software or system, and what conditions will you impose on the access and use of this product? Explain any terms of access and conditions of use, why these terms or conditions are justifiable, and how you will notify potential users of the software or system.

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

Part IV. Projects Creating Research Data

1. Summarize the intended purpose of the research, the type of data to be collected or generated, the method for collection or generation, the approximate dates or frequency when the data will be generated or collected, and the intended use of the data collected.

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

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

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.

5. What 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).

6. What documentation will you capture or create along with the dataset(s)? What standards or schema will you use? 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?

7. What is the plan for archiving, managing, and disseminating data after the completion of research activity?

8. Identify where you will be publicly depositing dataset(s):

Name of repository: _____

URL: _____

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

ORIGINAL PRELIMINARY PROPOSAL

Community as Collection

Project Description and Relevance to IMLS Funding Priorities

In library service a predominantly collection-driven approach is being replaced by a predominantly community-driven focus. Ideas of centering the librarians' work on community development have been discussed in work such as *The Atlas of New Librarianship* [1] (by the co-PI) and have seen wide adoption through ongoing efforts such as the American Library Association's Libraries Transforming Communities and even in IMLS's new strategic areas. Learning is an active process and so is driven by the community member, not by collections.

This project addresses IMLS's *Learning Spaces In Libraries* priority. We propose to build a tool that provides an infrastructure support to seamlessly incorporate human expertise into the services and collections of libraries. This will be done by building a "human library" platform to create profiles of community expertise, and readily connect librarians and library patrons to these community experts. This builds on the concept of the Human Library, an emerging, unique library service that promotes local knowledge sharing and collaboration. Unlike using physical library resources in traditional services, patrons interact with "human books" (people who volunteer to share their experience or expertise) for a wide variety purposes.

These efforts can best be summed up by the phrase: the community is the collection. The community of people using the library does not simply consume library resources, they also produce materials, and have expertise to share in the STEM areas as well as in history, tax preparation, legal topics, healthcare, and beyond. Add to this the growing reliance on librarians to provide mediated help of all sorts as governmental agencies reduce mediated help services. Where once a community member could meet with a tax advisor or social worker, now they are left with web pages (if they can access them). But they still have librarians! Rather than training librarians as tax experts, and social workers, we propose to help them build a network of experts for referral and consultation.

Impact: By building an infrastructure to help librarians weave together expertise from communities, libraries can be better positioned to aid in STEM education, community development, and advancing community aspirations. The true outcomes of this work are to provide valid working tools to tightly tie community expertise with the library and to highlight the importance of librarians as facilitators. Libraries enable the expansion of learning space for local community in a cost-efficient manner. The tool can also be incorporated into a larger national digital platform.

Project Team and Partners

The project will be conducted by a team of complementary expertise. Dr. Yun Huang, PI, built systems as vehicles for conducting her research. To date, she has built and deployed several production systems and open software. She has been awarded by NSF as a single PI and DOE as a co-PI to conduct her research projects focusing on crowdsourcing systems. She will provide the technical vision and expertise to build the infrastructure and tools that libraries can incorporate to implement the vision of the community as collection. Dr. R. David Lankes, Co-PI, and author of the aforementioned *Atlas*, will be the primary contact with the libraries who will partner with Syracuse University in this project, and will contribute his background in incorporating community expertise into library services and systems; and Dr. Jian Qin, who contributes her expertise in data management and information organization to link community expertise into a rich tableau of published resources and available library and non-library services. The team will collaborate with local academic libraries and Central New York public libraries to pilot the resulting infrastructure.

Project Goals, Plan and Projected Outcomes

Human books are volunteers who contribute their knowledge and time to the service. We collaborated with two academic and five Central New York local public libraries in 2014 to develop a mobile system to facilitate and promote their human library events. Human books sent their book titles and brief book descriptions to librarians, and librarians input the book information into our system [3]. Then patrons could review the book information using our mobile apps, available on both Android [4] and iPhone market [5]. These one-time human library

events have proved successful because both the human books and patrons enjoyed and would like to do it more. Through surveying event participants and interviewing even organizers, we also gained an initial understanding of why people created human books and why people checked out certain books [2]. Building on past projects to support human libraries, research into librarians as facilitators of learning, and ongoing research in virtual reference networks, we envision a human library infrastructure that is based upon a crowdsourcing platform. We propose to develop a way, using technology, that the “human books” and community demands of these books can be further incorporated into the library collection in a cost-efficient manner. Such that human library can be available on demand at a daily basis.

This proposed project will deliver a tool that can help identify what human books should, can, and need to be collected, how collections of human books are best built, represented and managed, and how a safe and flexible process of interacting with human books can be assured. We plan to design, develop and evaluate three types of user interactions. For example, we will develop the user interaction and functions for librarians to easily input and translate their knowledge of the community to help identify the desired human books. Our studies of the previous human library events showed that during the readings, human books might also discover something new in their lives [2]. We will design features that can help raise their awareness help human books better learn themselves. Thirdly, because location matters, we enable location-based book search and reservation services on mobile devices in a safe and flexible manner that takes into account patrons’ needs and concerns when using human library services.

Based on the initial understanding of the research space, we will conduct our study by using survey and user interview tools as well as system prototyping and field study. Below is a three-year project timeline. Each year involves user study, system design and implementation. Both of the activities will produce related publications.

Year One: In the first half of Year One, we will continue developing a set of surveys and interview studies to gain deeper understanding of (1) the challenges of providing human library services from librarians’ perspectives, (2) difficulty or concerns of creating human books from book volunteers’ perspectives and (3) motivations and expectations of using human libraries from patrons’ perspectives. Given that there are a series of human library events scheduled in 2015 and later years (<http://researchguides.library.syr.edu/humanlibrary>), we will conduct these studies with live events, and the results will provide us design insights and functional requirements of the mobile system. Based on these results, we will design a paper prototype of the system, and conduct evaluation studies with the above three types of prospective users.

Year Two: Using the feedback from the prototype study, we will revise the system design and implement the human library service infrastructure with “book” creation, sharing and indexing. We will further evaluate the design by running field trial studies. We will also record selected book readings and explore the opportunity and effect of sharing human book reading experience on human libraries.

Year Three: Based on the field trial feedback, we will develop further system tests and evaluate the overall performance of the key functions using the Technology Acceptance Model.

Estimated Budget: The grant budget is estimated at \$325,000, which will support PI and Co-PI salary, graduate students, dissemination travel, and the user studies. Additionally, Syracuse University will provide \$325,000 in cost sharing.

[1] R. David Lankes, *The Atlas of New Librarianship* (Cambridge, MA: MIT Press, 2011).

[2] Corey Jackson, Yun Huang, Abby S Kasowitz-Scheer, “Face-to-Face Matters: Inspirations from the Human Library.” To Appear in Themed Issue: *Collection of Best Papers from Mobile HCI 2014 Workshops of the International Journal of Mobile HCI (IJMHCI)*.

[3] Human Library Web Portal for Librarians, <http://humanlibrary.ischool.syr.edu>

[4] Human Library iPhone App <https://itunes.apple.com/us/app/human-library/id851223885?ls=1&mt=8>

[5] Human Library Android App <https://play.google.com/store/apps/details?id=edu.syr.ischool.humanlibrary>