

Omeka + Neatline: Easy + Powerful Collections Visualization, Mapping, and Display

1) Cover Sheet

BAA number: LOCBAAPENSOUSCE

Proposal title: *Omeka + Neatline: Easy + Powerful Collections Visualization, Mapping, and Display*

Technical point of contact: Tom Scheinfeldt, Center for History and New Media, George Mason University, 4400 University Drive, MS 1E7, Fairfax VA 22030-4444, (703) 993-4213, jscheinf@gmu.edu

Administrative point of contact: Michael Lakofski, Office of Sponsored Programs, George Mason University, 4400 University Drive, MS 4C6, Fairfax VA 22030-4444, (703) 993-4573, mlaskofs@gmu.edu

Summary of costs: Total costs = \$720,855 (including \$349,803 subcontract to the University of Virginia Library's Scholar's Lab)

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3) Proposal Overview and Contribution to Library Mission Goals and Outcomes

In the less than two years since its launch, the Center for History and New Media (CHNM) at George Mason University's *Omeka* web publishing platform <<http://omeka.org>> has made significant progress towards its goal of making sophisticated, standards-based web publishing available to even the smallest cultural heritage institutions. *Omeka* has been downloaded nearly 10,000 times and is used by hundreds of libraries, museums, and archives to display collections and build online exhibits. Dubbed "WordPress for cultural heritage collections," *Omeka*'s approachable open source code base, flexible front-end templating system, modular plugin architecture, growing repository of reusable add-ons, and extensive outreach and support programs have succeeded in building a robust, third-party, open source development community and a committed user base.

A key partner in building the developer community that is at the core of *Omeka*'s strength has been the Scholar's Lab at the University of Virginia Library, whose developers have contributed eight innovative open source plugins to the *Omeka* community. This work has been done out of a desire to make *Omeka* a more attractive and viable option to larger libraries and cultural heritage institutions (who might, for instance, host a Fedora-based repository of content), and also in connection with their *Neatline* project <<http://neatline.org/>>, a set of *Omeka* plugins for the creation of interlinked timelines and maps as interpretive expressions of the literary or historical content of archival collections. While *Omeka* has made it possible for hundreds of cultural heritage institutions to mount standards-based, collections-focused websites, *Neatline*'s plugins—including prototypes of *NeatlineMaps* (to connect the open-source geospatial server Geoserver with *Omeka*), *NeatlineFeatures* (to allow users to visually manipulate geographic features in *NeatlineMaps*), and SIMILE Timeline (to allow *Omeka* collections to be displayed along a timeline) as well as infrastructure to support this work in the context of large research libraries, such as *FedoraConnector* and EAD Import plugins—have achieved tremendous progress towards lowering the barriers to creating sophisticated geographic and temporal visualizations of *Omeka* collections.

Building on CHNM's extensive track record in building software for scholarship and cultural heritage that is free, open source, and well used, and Scholar's Lab's expertise in large scale digital library and archives technology development and deployment, data visualization, and geographic mapping, this project aims to expand the *Omeka-Neatline* collaboration to improve, expand, disseminate, and support a set of *Omeka* plugins to help libraries, archives, and museums—from the local level to the national level—deploy sophisticated geographic and temporal collections visualizations online.

In particular, we will contribute to the Library of Congress's goals outlined in Research Area 1 (Open Source Tools for Content Delivery in Cultural Heritage/Preservation Communities) with

deliverables in each of the three proposed outcome categories: Data Visualization, Geographic Mapping, and Community Resource Tools and Databases. This work will produce:

- *Omeka* Core Enhancements, to make possible new and more sophisticated kinds of plugin development (Area 1 - Outcome 3);
- Documentation Improvements, to facilitate third party plugin development and testing (Area 1 – Outcomes 1 and 3);
- Expansion and enhancement of *Neatline* plugins, to provide improved interoperability with library systems and improved geographic mapping and visualization facilities to *Omeka* users (Area 1 - Outcomes 2 and 3);
- Exemplar projects using the new software, for testing and demonstration purposes (Area 1 – Outcomes 1 and 2);
- Dissemination and support of the new software, to insure widespread use (Area 1 – Outcomes 1, 2, and 3);
- Evaluation and development of a project white paper, to document and disseminate a new model for open source collaboration (Area 1 - Outcome 1).

This plan of work will improve the *Omeka* code base, add new support mechanisms, and produce new documentation resources to facilitate and expand community plugin development, including by community developers at Scholar's Lab. It will deliver a set of *Omeka* plugins aimed directly at the Library of Congress's goal of improving geospatial and temporal collections visualization. It will test, disseminate, and support the new software in real-world situations. Finally, by bringing together two centers, both with long track records of innovation and successful digital project management in the fields of digital scholarship and cultural heritage, it will outline and disseminate a new model for developer-level collaboration on open source software.

4) Innovative Claims

Omeka + Neatline will make cultural heritage collections and data more accessible to broad audiences. Too many collections are trapped in closed local systems that make it nearly impossible for patrons to access them in meaningful ways. *Omeka + Neatline* will remedy this situation by providing cultural heritage institutions with user-friendly tools to present collections online in ways that capitalize on geospatial and temporal interpretive perspectives.

Omeka + Neatline will bring sophisticated data visualization and geographic mapping to smaller cultural heritage organizations. *Omeka + Neatline* will extend *Omeka*'s core capacity to expose, share, and interpret collections by adding a set of sophisticated geographic and temporal visualization tools. With *Omeka + Neatline* even institutions that have little in-house technical expertise will be able harness the geospatial data in their holdings in ways that were previously available only to institutions with a stable of specialists. The *NeatlineMaps*, *NeatlineFeatures*, and SIMILE Timeline plugins will work seamlessly with *Omeka* to display geospatial collections information, build interpretive maps and timelines, and give administrators control over geographic features and temporal views through an easy graphical user interface.

Omeka + Neatline will make Omeka function better in the context of larger research libraries and their collections. Technology staff at large research institutions with significant holdings are under tremendous pressure to expose collections and facilitate online access for scholars. *Omeka + Neatline* will significantly ease these burdens by providing a rich presentation tool that can leverage deep reserves of institutional collections resources and staff expertise. By connecting *Omeka* to Fedora, integrating BagIt, enabling easy import of collections metadata included in EAD records, and exposing the resulting *Omeka* websites to the power of faceted Solr searches, *Omeka + Neatline* will offer a powerful, economical, and efficient option to research libraries looking to expand online access.

Omeka + Neatline will define a new model of developer-level collaboration for open source software projects for libraries and academia. During the past two decades at least, the cultural heritage technology and digital humanities communities have experimented with a range of models for collaboration around open source software, often with limited success. In most cases, these models have aimed first at institution or administration level collaboration and only second, if at all, at collaboration further down the organization chart. The *Omeka + Neatline* collaboration was born out of direct communication between developers in IRC chat rooms and listservs rather than out of prior administrative decisions. *Omeka + Neatline* aims to expand this model of developer-level collaboration, to understand it better, and to describe it as an alternative model for open source software development and sustainability.

5) Technical Approach

INTRODUCTION

Too often cultural heritage professionals have been forced to choose between: a) collections management software that's good at standards and metadata but bad at online presentation; and b) web content management systems that are bad at standards but good at presentation. Libraries, archives, and museums that want to build a web presence that is at once collections-focused and standards-based and at the same time visually and interpretively rich are often disappointed. Faced with this choice and lacking the staff, expertise, and budget to build custom solutions, many (especially smaller) cultural institutions provide little substantive collections-based content online and instead limit their websites to "brochureware." The thought of providing sophisticated geographic or temporal visualizations of their collections and associated interpretative resources rarely enters the realm of serious consideration.

Launched in 2008 by the Center for History and New Media (CHNM) at George Mason University with the assistance of an IMLS National Leadership Grant, *Omeka* <<http://omeka.org>> is a next generation web publishing platform for collections-based research of all kinds, one that bridges the museum, library, and scholarly worlds through a set of commonly recognized standards. In doing so, *Omeka* puts serious web publishing within reach of all cultural heritage professionals and scholars. *Omeka* is free and open source (written for Linux, Apache, MySQL, and PHP and released under the GPL), easy to use, standards-based, and extensible. It is designed with non-IT specialists in mind, allowing users to focus on content and interpretation rather than programming. Its unqualified Dublin Core metadata structure and adherence to web standards allows anyone to design a fully accessible online exhibition efficiently. *Omeka*'s modular architecture and rich API empower people with a range of programming skills to participate in its open source community and expand its capabilities by adding custom design templates, specialized metadata element sets, and additional functionality through plugins. *Omeka*'s stability and sustainability is underwritten by a robust and growing volunteer developer community with an active dev list and open SVN repository. The strength of this community was recognized in December 2008 when a blue-ribbon panel of leading technologists and Internet pioneers awarded *Omeka* a Mellon Award for Technology Collaboration. Currently available as a server installable download, starting in late-2010 *Omeka* will also be available as a low- or no-cost subscription web service at Omeka.net.

In the less than two years since its launch, *Omeka* has made significant progress towards its goal of making sophisticated, standards-based web publishing available to even the smallest cultural heritage institutions. *Omeka* has been downloaded nearly 10,000 times and is used by hundreds

of libraries, museums, and archives to display collections and build online exhibits. Among these are large and venerable institutions like the New York Public Library and the Newberry Library as well as smaller, less renowned organizations like the Upper Ringwood (New Jersey) Public Library and the Madison-Jefferson County (Indiana) Public Library. These smaller institutions have used *Omeka* to build their own award-winning projects, such as Digital Amherst, a project of the Jones Public Library in Amherst, Massachusetts that recently won one of three awards for best use of cutting-edge technology from the ALA's Program on America's Libraries for the 21st Century.

A key partner in building the developer community that is at the core of *Omeka*'s strength has been the University of Virginia's Scholar's Lab, whose developers have contributed eight innovative open source plugins to the *Omeka* community. This work has been done out of a desire to make *Omeka* a more attractive and viable option to larger libraries and cultural heritage institutions (who might, for instance, host a Fedora-based repository of content), and also in connection with their *Neatline* project <<http://neatline.org/>>. With the assistance of a "Digital Humanities Start-up" grant from the National Endowment for the Humanities, the Scholar's Lab has prototyped *Neatline* as set of tools for the creation of interlinked timelines and maps as interpretive expressions of the literary or historical content of archival collections. *Neatline* is designed to promote collaboration by libraries and cultural heritage institutions with scholarly end-users, who will build on standard archival metadata, including EAD (Encoded Archival Description) and VRAcore to produce rich, evocative—even theoretical—geospatial and temporal visualizations of collections of catalogued letters, images, artifacts, and manuscripts. *Neatline* is therefore imagined as a geo-temporal framework for fruitful interchange among scholars and the stewards of primary resources. It builds on robust, open standards and services, including *Omeka*, OpenLayers, Geoserver, and SIMILE Timeline, and aims to provide a seamless, out-of-the-box experience for users without deep web development skills. *Neatline* was conceived as a project to produce an easily-installable, easily-configurable web-based application for the creation of interpretive and scholarly geo-temporal visualizations of archival collections expressed in standard metadata.

Initially, at the time its NEH grant was awarded, the *Neatline* project aimed to build a set of stand-alone tools. During the planning phase, however, the Scholar's Lab decided that building on *Omeka*'s strong platform would allow for broader adoption and easier use of their tools; would permit faster, better work; and would offer access to a robust and supportive existing network of community developers. *Neatline* has since evolved as a set of plugins for *Omeka*, designed to lower the barriers of launching online mapping projects and temporal visualizations. *Omeka*, in turn, has benefited from the Scholar's Lab's contributions to the security and flexibility of its core software, the growth of its developer community, and the possibilities opened up by an increasing number of well-designed plugins. The decision to collaborate on an existing project rather than proliferate new tools—a choice not often made among academic

software projects—marked the unselfish start of the exciting open source partnership between Scholar's Lab and CHNM that is the basis for this proposal and which we aim to advance through the project outlined below.

PROBLEM DESCRIPTION

Executive Summary: Cultural heritage institutions need easy-to-use, standards-based web publishing tools for displaying collections in geographic and temporal context.

Sophisticated geo-temporal visualization is not new to the humanities—nor is it a phenomenon unique to digital practitioners and their methods. Minard's 1869 time-based map of Napoleonic troop movements has (thanks to Edward Tufte's evangelism) become trite in design discussions, but it points to a rich set of print-media approaches—many cataloged and analyzed by scholars like J.B. Harley, Mark Monmonier, John Krygier, and Dennis Wood—on which we can draw for visual inspiration. For interpretive examples in history and literary studies, we look first to the synthetic work of Alan Baker and of Anne Knowles in describing historical applications of geography and geographical information systems (GIS), and then to the critical uses of geography by scholars like J. Hillis Miller (on Hardy) or John Gillies (on Shakespeare), as well as to the formal experimentalism of Franco Moretti in graphing and mapping literary texts for knowledge discovery. More recently, the Institute for Advanced Technology in the Humanities (IATH) at the University of Virginia has been a leader in the production of web based maps and timelines, and the recent establishment of a "Digital Cultural Mapping" program at UCLA is a mark of the currency of these approaches to humanities inquiry and pedagogy at other institutions.

However, most geo-temporal interface development by scholars has either required use of expensive, proprietary ESRI software or has been in a "one-off" mode—as with Ben Ray's notable Flash map of accusations in the Salem Witch Trials—not utilizing community-supported open-source toolsets or building on common standards. Furthermore, production of geo-temporal visualization has typically required scholars to partner intensively with technical staff to make any headway in their work. All of these factors have contributed to what Martyn Jessop, in a 2008 article in *Literary and Linguistic Computing*, terms an "inhibition of geographical information in digital humanities scholarship."

Surprisingly, it is only lately that commercial, desktop GIS toolsets—primarily created for use in synchronic contexts in the sciences—have begun to account for time as a matter of course. And relatively recent development of generalized, web-based tools and services for timeline and map creation either continues in the vein of one-off production or has other key failings that limit usefulness and adoption in a humanities context. None of the proliferating tools that build on Google Maps and simple timeline widgets has enabled easy import of archival metadata for scholarly annotation. Most tools are rigid in their conception of space and modern in their

expression of geography. Google Maps, for instance, does not allow for the use of historical maps that require higher-order transforms such as re-projection or skewing to match a modern street grid. Other hosted services like Dipity and GeoCommons have simple mapping and temporal features, but are not open, extensible, or easy to integrate with historical maps and offline archival materials. Although their ease of use and the inherent value of spatial and temporal lenses through which to view the humanities has brought such tools quickly into classroom application, they remain ill-suited to the modeling and meaning-making needs of scholars.

To become more useful to scholars and cultural heritage professionals, geospatial tools require a rethink. In particular, two major shifts to the landscape of geo-temporal visualization have to occur to make the methods more broadly applicable to the needs, expectations, and workflows of users working in libraries, archives, museums, and academia.

First, most scholars and cultural heritage professionals aren't interested in technology for technology's sake and therefore expect a seamless, out-of-the-box user experience. Tools must be simple to install and use. Having to rely on multimedia developers or GIS consultants for set up and support reduces opportunities for the kind of low-risk experimentation and easy web publication that will build interest in these methods.

At the same time, however, the tools must be sophisticated enough to interoperate with existing collections systems where scholarly and cultural heritage users will obtain their data. This is where consumer tools like Google Maps or Dipity fall short. Archivists, for example, will want to build on resources expressed in a standard "encoded archival description" (EAD) metadata format. EAD could serve as a stepping-stone to rich, interpretive or theory-based expression and visualization of the content of primary resources. Yet getting standardized collections metadata like EAD into Google Maps or other "easy" consumer mapping and visualization tools is anything but easy.

The combination of *Omeka*'s ease of use and *Neatline*'s powerful, archives-focused geospatial toolset has brought these twin problems within reach of a solution. *Omeka* has made it possible for hundreds of cultural heritage institutions to mount standards-based, collections-focused websites. *Neatline*'s *Omeka* plugins—including prototypes of *NeatlineMaps* (to connect the open-source geospatial server Geoserver with *Omeka*), *NeatlineFeatures* (to allow users to visually manipulate geographic features in *NeatlineMaps*), and SIMILE Timeline (to allow *Omeka* collections to be displayed along a timeline) as well as infrastructure to support this work, such as *FedoraConnector* and EAD Import plugins—have achieved tremendous progress towards lowering the barriers to creating sophisticated geographic and temporal visualizations of *Omeka* collections.

Yet much remains to be done to refine these prototypes to make it easier, more affordable, and sometimes just plain imaginable for libraries, archives, and museums—especially smaller institutions—to outfit their websites with interactive maps and timelines. Likewise, although the ad-hoc *Omeka-Neatline* collaboration has been extremely fruitful on both sides, there are several avenues of collaboration that remain to be explored and lessons to be learned and disseminated—particularly lessons about the nature of open source collaboration—to other academic and cultural heritage software projects.

RESEARCH GOALS

Executive Summary: Omeka + Neatline will make cultural heritage collections and data more accessible to broad audiences; will bring sophisticated data visualization and geographic mapping to smaller cultural heritage organizations; will make Omeka function better in the context of larger research libraries and their collections; and will define a new model of developer-level collaboration for open source software projects for libraries and academia.

Omeka has made standards based, serious online publishing of cultural heritage collections easy and approachable, putting the power and reach of the web in the hands of a wide range of academics and cultural professionals. *Neatline* has laid the groundwork for a set of tools that will allow cultural heritage professionals to use *Omeka* to create interlinked timelines and maps. *Omeka + Neatline* will carry this partnership further to meet research goals in four key areas.

First, we aim to advance *Omeka*'s mission of making cultural heritage collections more accessible to the broadest possible audience. Too many collections are trapped in closed local systems that make it nearly impossible for scholars, students and teachers, and members of the interested public to access them in meaningful ways. *Omeka + Neatline* will remedy this situation by providing cultural heritage institutions with user-friendly tools to present collections online in ways that capitalize on geospatial and temporal interpretive perspectives. Previously, creating public facing content that included this level of sophisticated interpretation would have been outside the reach of most institutions, but *Omeka + Neatline* places easy to use, open source tools in the hands of cultural heritage professionals and empowers them to share collections and collections data.

The enhancements we will make to the *Omeka* core as part of this project will make cultural heritage collections and data even more accessible to broad audiences and will allow institutions to serve these audiences more easily and less expensively. Improvements to *Omeka*'s core plugin API and improved documentation and support for the plugin development community will make it easier for institutions to implement the rich functionality of existing plugins like *Omeka*'s document and media wrappers, *SimplePages* editor, OAI harvester and OAI provider, LC subject headings, QR codes, and image annotation (see <http://omeka.org/add-ons/plugins/> for a more complete list of available *Omeka* plugins). Even more importantly, these improvements will help

institutions and community developers to imagine and develop new widgets of their own. Improvements to *Omeka*'s core Exhibit Builder (the pre-bundled plugin that allows every *Omeka* user to quickly build interpretive exhibits through a drag and drop interface) and improvements to *Omeka*'s core administrative user interface (the control panel where *Omeka* site administrators add, sort, edit, and describe collections, manage user permissions, enable plugins, activate design templates, and build exhibits) will make the *Omeka* experience even more transparent to novice users and snappier and more efficient to experienced ones. Finally, an expansion of *Omeka*'s already robust outreach program will insure that users who choose *Omeka* + *Neatline* will have the support they need to achieve their goals.

Second, *Omeka* + *Neatline* will bring sophisticated data visualization and geographic mapping to smaller cultural heritage organizations. *Omeka* + *Neatline* will extend *Omeka*'s core capacity to expose, share, and interpret collections by adding a set of sophisticated geographic and temporal visualization tools. With *Omeka* + *Neatline* even institutions that have little in-house technical expertise will be able harness the geospatial data in their holdings in ways that were previously available only to institutions with a stable of programmers and geographic information specialists. The *NeatlineMaps*, *NeatlineFeatures*, and SIMILE Timeline plugins will work seamlessly with *Omeka* to display geospatial collections information, build interpretive maps and timelines, and give administrators control over geographic features and temporal views through an easy graphical user interface. *NeatlineMaps*, for example, will allow users to ingest georeferenced images into *Omeka*, leveraging the power of the open source Geoserver, add them as parts of interactive maps. *NeatlineFeatures* will let users manipulate geographic features in *NeatlineMaps* through a simple editor in the *Omeka* administrative interface.

Third we will make *Omeka* function better in the context of larger research libraries and their collections. Originally designed to meet the needs of smaller institutions (say, county historical societies), *Omeka* has scaled impressively and is now used by as many large research libraries and large regional museums as it is by smaller organizations. Among *Omeka*'s keenest adopters, for example, are the Columbia University Library, the New York Public Library, the Minnesota Historical Society, and the University of Arizona Library. These users are drawn to *Omeka*'s straightforward and flexible, but standards-based approach that makes it easy to get collections out of institutional repositories and digital asset management systems and formatted in visually and interpretively compelling web displays. Technology staff at institutions with significant holdings are under tremendous pressure to expose collections and facilitate online access for scholars. *Omeka* + *Neatline* will significantly ease these burdens by providing a rich presentation tool that can leverage deep reserves of institutional collections resources and staff expertise. By connecting *Omeka* to Fedora repositories, enabling easy import of collections metadata included in archival EAD records, and exposing the resulting *Omeka* websites to the power of a finely faceted Solr search, *Omeka* + *Neatline* will offer a powerful, economical, and efficient option to research libraries looking to expand online access.

Finally, through these efforts, *Omeka + Neatline* will define a new model of developer-level collaboration for open source software projects for libraries and academia. During the past two decades at least, the cultural heritage technology and digital humanities communities have experimented with several models of collaboration around open source software, often with limited success. In most cases, these models have aimed first at institution or administration level collaboration and only second, if at all, at collaboration further down the organization chart. These institutionally driven collaborations have often been described under the heading of “community source.” Although the community source model has seen some notable successes, it all too often results in projects that fail to attract sufficient personal buy-in from key developers and thus tend to stall after the initial commitment from the campus or library administration runs out. Instead of the institutional collaboration model of community source, this project will locate the focus of collaboration differently—at the developer level. We believe this approach will yield a quicker development cycle, a more dynamic community membership, greater responsiveness to community needs, and tools that are used by more people. The *Omeka-Neatline* collaboration was born out of direct communication between developers in IRC chat rooms and listservs rather than out of any prior administrative decision. *Omeka + Neatline* aims to expand this model of developer-level collaboration, to understand it better, and to describe it as an alternative model for open source software development and sustainability.

EXPECTED IMPACT

Executive Summary: The broader impacts of this project will be twofold: 1) It will open up sophisticated geographic mapping and temporal visualization to much broader constituencies and foster their use; 2) It will be a model for collaboration between libraries and humanists in the creation of open source software tools for scholarship and learning.

1) Expand the use of geographic mapping and temporal visualization tools.

The key metric for the success of this project will be use. The databases of Sourceforge and Google Code are littered with interesting, even useful, but conspicuously unused open source tools. Academic software projects are no exception. Every year NSF, NIH, and now NEH and IMLS award grants for scholarly software development. In recent years, the funding guidelines have stipulated that this software be made freely available under open source licenses. Much of the software produced by these programs is good and useful code. But little of it is actually used.

There are at least two reasons for this. Many efforts are focused narrowly on the problems of a particular researcher or lab. While the code produced by these researchers proves useful for solving their particular problems, even when released, it hasn’t been designed to be generally applicable to the needs of other researchers in the field. It is, in effect, a one-off tool released as open source. But open source code alone does not constitute an open source project.

Other projects build generalized tools that may be of potential use to other researchers. But few make the necessary investment in outreach and marketing to make potential users aware of the tool. It is for this reason, among others, that we see so much duplication of effort and functionality in scholarly software projects.

Building a user community is the first prerequisite to building a successful open source software project. The success of software is judged by its use. The universal assessment that iTunes is a hit and Zune is a flop is not based on the quality of the code or even the elegance or potential usefulness of the experience. It's based on the fact that everybody uses iTunes and nobody uses Zune. This is not to say that software has to have millions of users to be successful. But it is to say that successful software is used by large swath of its potential users. To be sure, the total population of potential users of cultural heritage mapping tools is much smaller than the total population of potential users of digital media playback software. But any open source software project's goal should be adoption by as many of its potential users as possible. In the case of *Omeka + Neatline*, we should aim to have our software used by as many cultural heritage institutions and digital humanists as possible.

Moreover, a large and enthusiastic user base is key to a successful open source software project's continued success. If people use a product, they will invest in that product. They will provide valuable user testing. They will support the project in its efforts to secure financial support. They will help market the product, creating a virtuous circle. Sustainability, even for free software, is grounded in a committed customer base.

Related to building a user community is building an open source developer community. Some number of users will have the inclination, the skills, and the commitment to the project to help on the level of code. This percentage will be very small, of course, less than one percent—which is itself another reason to build a large user base. But this small group of code contributors and volunteer developers forms the core of most successful open source projects. Community developers find and fix bugs. They provide end user support. They write documentation. They add new features and functionality. They provide new ideas, vision, and critical assessment. They constitute a ready-made pool of job candidates if a core paid developer leaves a project.

A developer community does not develop on its own, of course. It requires support. First and foremost, a developer community needs open communication channels—an active IRC channel and listserv, for example—something which, in the case of a university of library-based project, means a group of responsive staff developers on other end. Community developers need profitable access to the project's development roadmap so they know where best to contribute their efforts. They need well-documented and thoughtfully-designed APIs. They need technical entry points, things such as a plugin architecture where they can hone their chops on small bits of functionality before digging into the core code base. Most importantly, community developers need a sense of community, a sense of shared purpose, and a sense that their volunteer

contributions are valued. All of this has to be planned, managed, and built into the software architecture.

A philosophy of use is core to CHNM's vision of open source software for scholarship and cultural heritage. *Zotero*, our open source research management tool, is case in point. Supported by robust end-user outreach and developer support channels, *Zotero* is used by more than 1,000,000 people every day. *Omeka* is built on the same principles. Since the outset of the *Omeka* project, use of the software has been paramount in our planning and execution. In less than two years, *Omeka* has been downloaded thousands of times to create hundreds of collections-based websites, the result of a vigorous outreach and marketing effort that has included numerous conference presentations; direct conversations and visits with libraries, archives and museums around the world; a robust program of publishing and blogging; a multi-channel social media campaign; and especially a responsive end-user support system based around an active online support forum. This focus extends to *Omeka*'s developer community, which is supported by an extensive documentation wiki; an active Google Group for questions, answers, and ideas; an open code repository and Trac ticketing system; regular "office hours" with the *Omeka* team on IRC; free training "playdates" at CHNM; and plugin and theme architectures that are designed to facilitate outside code contributions. As a result, *Omeka*'s dev list has grown to nearly 200 members, receives more than 2000 visitors per week, and hosts several substantive discussions of code every day.

We will extend this philosophy of use to *Omeka + Neatline*, building the kind of easy-to-use and easy-to-maintain software, outreach and marketing programs, and developer community support mechanisms that will increase opportunities for geographic and temporal visualization work, especially among organizations and practitioners that have not previously had access to the technologies or expertise to do accomplish it. Broad use of the tools and the feedback this will generate will in turn help us to better isolate the needs and interests of the cultural heritage community when it comes to online mapping of collections, and we will respond to that feedback with iterative improvements. These lessons will also help the Library of Congress meet its goal of formulating best practices for tool development and enhancement and will be communicated in our interim and final reports (Task 11).

Three activities will be key to insuring *Omeka + Neatline* is used. First, we will produce two model projects to serve as signposts and inspiration to existing and prospective *Omeka* users (Task 9). Second, we will engage in a vigorous program of dissemination and end user support (Task 10). Third we will provide developer community support in the form of new code (Task 1) and improved documentation (Task 2). The result of these efforts will result in at least fifty institutional users of the *Omeka + Neatline* tools and at least a half dozen community developers contributing code or making other substantive contributions to the project.

2) Advance a new model of developer-level collaboration.

“Community source” is a term often heard in academic and library technology circles. As Brad Wheeler wrote in *EDUCAUSE Review* in 2007, a community source project is distinguished from more generic open source models by the fact that “many of the investments of developers’ time, design, and project governance come from institutional contributions by colleges, universities, and some commercial firms rather than from individuals.” Funders of open source software in the academic and cultural heritage fields have often preferred the community source model assuming that, because of high level institutional commitments, the projects it generates will be more sustainable than projects that rely mainly on volunteer developers. In these community source projects, foundations and government funding agencies put up major start-up funding on the condition that recipients commit regular staff time—“FTEs”—to work on the project alongside grant funded staff.

The community source model has proven effective in many cases. Among its success stories are Sakai, an open source learning management system, and Kualu, an open source platform for university administration. Just as often, however, community source projects have failed. They have done so usually in one of two ways: either they become mired in meetings and disagreements between partner institutions and never really get off the ground in the first place, or they stall after the original source of foundation or government funding runs out. We believe that in both cases, community source failures lie in the failure to win the “hearts and minds” of the developers working on the project.

In the first case—projects that never really get off the ground—developers aren’t engaged early enough in the process. Because they rely on administrative commitments of human resources, conversations about community source projects must begin with administrators rather than developers. These collaborations are born out of meetings between administrators located at institutions that are often geographically distant and culturally very different. The conversations that result can frequently end in disagreement. But even where consensus is reached, it can be a fragile basis for collaboration.

We often tend to think of collaboration as shared decision making. But more important is shared accomplishment. Consensus on a project is certainly important, but strong collaborations aren’t forged in talking, they’re forged in working. In this project we will demonstrate an alternative model, one that asserts that the most successful open source collaborations occur as the level of work, not at the level of discussion.

In the second case—projects that stall after funding runs out—decisions are made for developers (about platforms, programming languages, communication channels, deadlines) early on in the planning process that may deeply affect their work at the level of code sometimes several months down the road. These decisions can stifle developer creativity or make their work unnecessarily difficult, both of which can lead to developer disinterest.

Yet what sustains an open source project after funding runs out is the personal interest and commitment of developers. In the absence of additional funding, the only thing that will get bugs fixed and forum posts answered are committed developers. While more decentralized, fully volunteer open source projects face the conspicuous disadvantage of scant resources, on the other hand, by definition, their volunteer developers participate because they want to. Developer interest is often a project's best sustainability strategy. In this project we will look to demonstrate and disseminate a model of project planning, communication, and sustainability driven by developer interests and commitments.

For this project, *Omeka + Neatline* will model a developer driven brand of open source collaboration in scholarly and cultural heritage software. *Omeka + Neatline* was born out of direct communication between developers in IRC chat rooms and listservs rather than out of a prior administrative decision. This is the same level of interaction that drives many successful, particularly end user focused, open source projects of more general interest such as Firefox and WordPress. We aim to use the *Omeka + Neatline* experience funded by this project to expand our experiment in developer-level collaboration, to understand it better, to appropriate the best aspects of collaboration both on the vernacular web (e.g. WordPress and Firefox) and within the community source movement, and finally to advance an alternative model for open source software development and sustainability.

APPROACH

Executive Summary: Omeka + Neatline will build on CHNM and Scholar's Lab's existing collaboration to bring improved collections access and online geo-temporal displays to users in large and small cultural heritage organizations by improving Omeka's plugin architecture and documentation; building a set of six plugins to aid geo-temporal display of especially archival collections; developing two exemplar projects for testing and demonstration; disseminating and supporting the new software; and evaluating the project and delivering a white paper.

This proposal brings together a group of experienced partners who have proven they can deliver on the ambitious goals of the project. Since its inception in 1994, CHNM has used digital media and technology to advance historical education and understanding, preserve and present history online, and transform scholarship across the humanities. CHNM boasts a staff of nearly 50 people (a dozen of them with doctoral degrees) and more than three-dozen active projects. It has conducted over \$20 million of grant-funded research, and has freely given away all of the educational materials, archives, and software it has created. Its websites and software are among the most popular in academia—and outside of it. Each year CHNM's many project websites, staff blogs, podcasts, and open access publications receive more than 16 million visitors, and over a million people rely on its award winning digital tools to teach, learn, and conduct research. CHNM's work has been recognized with major awards and grants from the American Historical Association, the National Humanities Center, the National Endowment for the

Humanities, the Department of Education, the Library of Congress, the Institute of Museum and Library Services, the National Historic Publications and Records Commission, the National Science Foundation, and the Mellon, Sloan, Hewlett, Kress, Rockefeller, and Kellogg foundations.

Likewise the University of Virginia Library has long demonstrated its organizational readiness to undertake new initiatives and forge experimental models to meet the needs of librarians and humanities researchers within a rapidly changing technological scene. The Library's engagement with web-based geospatial visualization dates to the mid-1990s when the Geospatial and Statistical Data Center began to consult on and produce innovative web applications in collaboration with faculty and with centers such as the Institute for Advanced Technology in the Humanities (IATH) and the Virginia Center for Digital History (VCDH), both housed and nurtured by the Library. Over the past seventeen years, the Library has aggressively pursued the creation of distributed and flexible technical systems that enhance access, manipulation, storage, distribution, and integration of information for research and pedagogy. In 2006, the Library's Electronic Text Center merged with its successful Geospatial and Statistical Data Center (in operation since 1996) and with a Research Computing Support Center belonging to our University-level IT division. These merged centers became the Scholars' Lab, located in a renovated space in Alderman Library. Jointly staffed by the Library's Digital Research & Scholarship department and ITC's Research Computing Support group, the Scholar's Lab offers a welcoming place for faculty and students to explore tools and content, receive assistance with digital projects, collaborate on research, and participate in intellectual programming such as Scholar's Lab's NEH-funded Institute for Enabling Geospatial Scholarship in 2010 and the seventh annual Scholarly Communication Institute on "spatial technologies and methodologies" in 2009.

Omeka + Neatline's success will be grounded in the experience and expertise of CHNM and Scholar's Lab, experience and expertise uniquely suited to the Library of Congress's goals of supporting open source tools for content delivery in cultural heritage and preservation, particularly data visualization, geographic mapping, and community resource tools. To deliver these tools, the work of the *Omeka + Neatline* project will fall into six main areas to be completed over two years.

First, *Omeka + Neatline* will deliver enhancements to the core *Omeka* software upon which the rest of the technical work outlined in the proposal depends. It will add new hooks and filters to the *Omeka* plugin API that will be useful to both the *Neatline* team and third-party community developers in building advanced plugins. In addition, the data intensive work outlined in this proposal will push the limits of the *Omeka's* existing data model, and the *Omeka* team will make any changes to this model necessary for the completion of the work. Finally, the addition of so many advanced features and changes to the data model will require substantial changes to the *Omeka* administrative user interface and core Exhibit Builder. In each case, these iterative

refinements will be made in conversations with the *Neatline* team and the broader developer community to insure them the broadest range possibilities for future development.

Second, *Omeka + Neatline* will deliver detailed documentation for developers seeking to build plugins and implement unit and integration tests. All new and improved documents will be freely available and editable by community members on the *Omeka* Codex wiki. New information will include use cases, example code for plugin API elements, information about *Omeka*'s database object system and helper functions, and documentation on how plugins can interact with *Omeka* on a lower level. The *Omeka* team will also provide plugin developers with detailed instructions and best practices for writing and carrying out testing routines for plugins. This work will be coordinated with quarterly meetings of a "documentation working group" of interested members of the developer community. The outcome will be improved information for the *Omeka* development community on how to develop plugins, resulting in greater participation and higher quality third-party code contributions.

Third, *Omeka + Neatline* will deliver six production-ready plugins to the *Omeka* user community. This task will take the proof-of-concept and prototype work already conducted by the *Neatline* team to produce production-ready versions of the *FedoraConnector* plugin, the *NeatlineMaps* plugin, the *NeatlineFeatures* plugin and the *SolrSearch* plugin. The *Neatline* team will also produce two releasable packages, a PHP library for working with BagIt materials and an *Omeka* plugin allowing users to ingest and generate BagIt compliant packages for *Omeka* objects. Each plugin will be accompanied by thorough documentation on the *Omeka* Codex. In addition to these plugins, the *Neatline* team will conduct a survey of current and potential *Omeka* users within the scholarly and cultural heritage communities to identify and prioritize a list of additional plugins, particularly metadata importers, for further research and community development.

Fourth, *Omeka + Neatline* will develop two exemplar *Omeka-Neatline* projects for testing, demonstration, and outreach purposes. The first project will involve a collection of letters of the early 20th-century horror writer, H. P. Lovecraft. The second project relates to the letters and maps of Jedediah Hotchkiss, cartographer in Stonewall Jackson's Shenandoah Valley campaign. These real-world projects will insure the suite of plugins we are developing will function well together and will be applicable to scholarly use cases. They will also insure that outreach staff has sufficient content available to demonstrate our work at conferences and other publicity venues and produce useful, relevant documentation for users.

Fifth, *Omeka + Neatline* will conduct online and in-person outreach and user support to insure the software we develop is widely used and continues to attract a vigorous volunteer developer community. Dissemination activities will include using social media channels to reach potential and existing users, delivering at least four conference presentations, conducting at least two workshops, expanding and maintaining the *Omeka* user forums, and improving end user

documentation in the *Omeka* Codex. The result of these efforts will be least fifty new institutional users of the software and at least six new community developers.

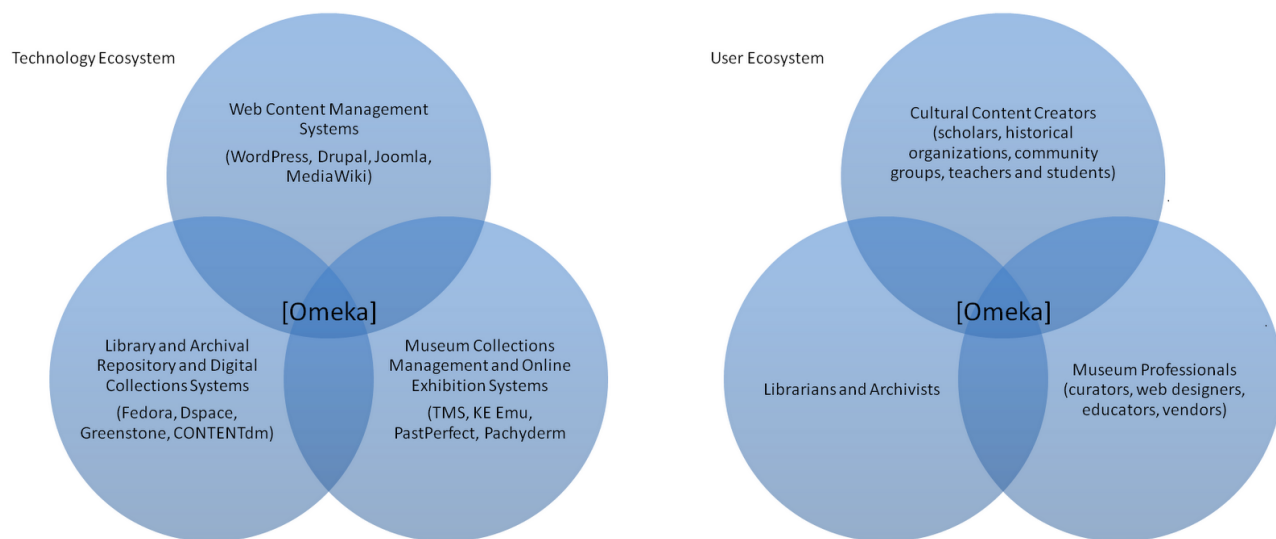
Sixth, *Omeka + Neatline* will implement a program of iterative development and evaluation, including unit testing, user surveys, and open lines of communication between project staff and open source developer communities. First, we will engage in an agile development process that will allow for many points of testing, feedback, and mid-course corrections. Second, we will conduct two feedback surveys with users during the course of development in Spring 2011 and Spring 2012. The results of these two surveys will assist the development teams in considering the needs of end users while development is still underway. Third, we will maintain open communication channels with all of our users. Finally, the PIs at CHNM and Scholars' Lab will draft and deliver a white paper describing the history of the *Omeka + Neatline* partnership, synthesizing our shared experiences in developing *Omeka + Neatline*, outlining a new model for developer-level collaboration, and proposing a set of generalized best practices for similar open source software collaborations.

To accomplish this work we will extend the collaboration we have already forged. Though CHNM is the prime and Scholar's Lab is the sub, as the equal split in the budget shows, each organization will be a full partner on the project. That said, we will establish clear lines of responsibility and clear lines of communication so everyone knows who is doing what and so our efforts result in a coherent outcome and a usable product. Project management will occur on the open channels of the *Omeka* Dev List and *Omeka's* Trac ticketing system. Bi-weekly phone calls will be scheduled to discuss completed activities and next steps and notes will be submitted following each call. We will arrange at least one in person meeting per semester between the project partners and we will encourage regular site visits by Library of Congress program staff.

6) Comparison with Current Technology

Omeka: The emergence of the web has brought humanists and librarians into increasingly closer contact and conversation as humanists are required to think differently and more deeply about the nature of information and librarians are required to play an ever more public role online. Yet these groups' respective tool sets have remained largely separate. Collections professionals operate in a world of institutional repositories (Fedora, DSpace), integrated library systems (Evergreen, Ex Libris), and digital collections management systems (CONTENTdm, Greenstone). The humanist or interpretive professional's online tool set is usually based around an off-the-rack web content management system such as WordPress (for blogs), MediaWiki (for wikis), or Drupal (for community sites).

The librarian's tools are excellent for preserving digital collections, maintaining standardized metadata, and providing discovery services. They are less effective when it comes to exhibiting collections or providing the rich visual and interpretive context today's web users expect. They are also often difficult to deploy and expensive to maintain. The blogs, wikis, and off-the-rack content management systems of the humanist (and, indeed, of the public programs staff within collecting institutions, especially museums) are the opposite: bad at handling collections and standardized metadata, good at building engaging experiences, and relatively simple and inexpensive to deploy and maintain. *Omeka* aims to fill this gap by providing a collections-focused web publishing platform that offers both rigorous adherence to standards and interoperability with the collections professional's toolkit and the design flexibility, interpretive opportunities, and ease of use of popular web authoring tools.



***Neatline*:** In the past sophisticated geo-temporal visualization has either required use of expensive, proprietary GIS software or has been in a “one-off” mode, not utilizing community-supported open-source toolsets like *Omeka*, open stores of maps and archival information like those housed in Fedora repositories, or open geospatial data standards like those of the GDC. Furthermore, production of geo-temporal visualization has typically required scholars to partner intensively with technical staff. The relatively recent development of generalized, web-based tools and services for timeline and map creation either continues in the vein of one-off production or has other key failings that limit usefulness and adoption in a humanities context. None of the proliferating tools that build on Google Maps and simple timeline widgets enables easy import of archival metadata for scholarly annotation. Other hosted services like Dipity and GeoCommons have simple mapping and temporal features, but are not open, extensible, or easy to integrate with historical maps and offline archival materials.

The most notable software contribution to the field of geospatial and temporal visualization in the humanities is a late-1990s Java applet from the University of Sydney’s Archaeological Computing Laboratory, called TimeMap/Heurist. It has been very slow to penetrate the digital humanities community—and particularly to excite developers who might contribute to its source code. Unlike our integration of *Neatline* with *Omeka*, however, TimeMap does not lend itself to the easy experimentation that would attract a base of users not already committed to intensive digital work. It is also not easily integrated with digital objects in Fedora repositories.

Both Google and TimeMap applications and a number of other geo-temporal visualization tools—including *Neatline*—are analyzed against a dozen core criteria in the table below. These criteria include various measures for ease of use and suitability to the kinds of data (including scanned historical maps) that humanities users—particularly scholars interested in archival materials—will require. *Neatline* is projected to meet eleven of these benchmarks. Its closest competitor, the TimeMap tool, meets five.

	Sydney TimeMap	Heurist	Google TimeMap	SIMILE Exhibit	Geo- Commons	Dipity	Neatline
Able to re-project historical maps							
Handles EAD input							
Synchronizes raster data with timeline							
Synchronizes feature data with timeline							
Provides forms-based editors for feature data							
Provides map-based graphical editors for features							
Provides prebuilt statistical datasets							
Easy for a single scholar to create and support							
Open-source code is available for independent hosting							
Capable of using open Web GIS services (WMS)							
Handles B.C. dates							
Handles shapes & lines, not just points							

7) Statement of Work

TASK 1: IMPROVEMENTS TO THE *OMEKA* CORE AND PLUGIN ARCHITECTURE

General Description: This task will enhance the *Omeka* plugin API, data model, user interface, and Exhibit Builder, facilitating the work of both the *Neatline* team and third party community plugin developers.

Detailed Description: To support the work of the *Neatline* team and to improve possibilities for additional third-party plugin development, we will work with the community of developers to improve the plugin API, add new hooks and filters that will be useful to plugin developers, update the data model of *Omeka* as required for these new features, and improve the *Omeka* administrative user interface per feedback from the developer community. We will also add improvements and features to Exhibit Builder for a major 2.0 version release. Among other things, this release will include a layout wizard that will replace the current, static template method for building layouts in Exhibit Builder with a more robust graphical user interface and will include support for other plugins to integrate with Exhibit Builder.

Organization Responsible: The Center for History and New Media will assume responsibility for *Omeka* core development. Jeremy Boggs will manage development activities and will have primary responsibility for *Omeka* user interface design enhancement. John Flatness will have primary responsibility for improvements to *Omeka*'s plugin API and updates to the core data model. He will also serve as lead developer for the Exhibit Builder 2.0 release.

Outcome: Completion of this task will produce changes to the *Omeka* core that will facilitate the work of the *Neatline* team in particular and provide new development pathways for third-party community developers in general.

Deliverables: Improve *Omeka* plugin API, improve *Omeka* data model, improved *Omeka* user interface, Exhibit Builder 2.0.

TASK 2: *OMEKA* PLUGIN DOCUMENTATION

General Description: *Omeka* Plugin Documentation will add to and improve existing documentation for *Omeka* plugin development.

Detailed Description: To help *Omeka* plugin developers, this task will expand existing documentation for *Omeka* plugin development. First, we will improve documentation on *Omeka*'s numerous hooks and filters. This will involve adding use cases and example code for the API elements that are already documented, as well as creating comprehensive documentation on how plugins can interact with *Omeka* on a lower level. In particular, *Omeka*'s database

object system, which is the key both storing and accessing data in *Omeka*, will be thoroughly documented and explained. Additionally, *Omeka*'s helper functions, which are currently documented with respect to themes exclusively, will be expanded to cover situations where they can be used in plugin development. Finally, this task will provide plugin developers with detailed instructions for how to add automated testing to their *Omeka* plugins. This will include details on best practices, specific use cases for *Omeka* plugins, and example code developers can use when writing tests. We will also convene quarterly meetings of a “documentation working group” of interested members of the developer community to help us carry out ongoing assessments and iterative improvements to *Omeka*'s documentation.

Organization Responsible: The Center for History and New Media at George Mason University will assume responsibility for *Omeka* core development. Jeremy Boggs will lead development of the plugin documentation and convene the documentation working group. John Flatness will contribute additional documentation as necessary.

Outcome: The outcome of this task will be improved information for the *Omeka* development community on how to develop plugins, resulting in greater participation and higher quality third-party code contributions.

Deliverables: Detailed documentation on the *Omeka* Codex for developers seeking to build plugins and implement unit and integration tests.

TASK 3: FEDORA CONNECTOR PLUGIN DEVELOPMENT

General Description: The *FedoraConnector* plugin will allow *Omeka* users to use objects from a Fedora Commons repository in *Omeka SimplePages* and exhibits.

Detailed Description: By leveraging the SOAP interface provided by the FedoraCommons infrastructure, we will provide a method for *Omeka* users to use curated objects in their *SimplePages* and exhibits. The plugin will automate the handling of various data streams (including zero-parameter disseminations) in their description within the *Omeka* framework, as well as Dublin Core synchronization when object metadata is updated in the Fedora repository. The administrative panel for the plugin will provide users with an intuitive configuration interface for managing FedoraCommons target servers, as well as a method to perform batch synchronization of FedoraCommons metadata to *Omeka*. This will help ensure the longevity of media objects used in *SimplePages* and exhibits, with minimal user interaction as digital formats migrated in the future. The initial design of the administrative interface will be based on our working knowledge of scholars' needs and professional librarians on staff. As part of the development cycle, we will also make public requests for comment on design prototypes to refine the final plugin. After the plugin code is complete, the plugin will be documented and a series of screencasts explaining the plugin's usage will be developed.

Organization Responsible: The University of Virginia's Scholar's Lab will assume responsibility for the development of this plugin, with Adam Soroka taking primary responsibility for the design and implementation of the software and Ronda Grizzle overseeing the user documentation and screencast development.

Outcome: The outcome of this task will result in a plugin allowing *Omeka* users to leverage FedoraCommons curated objects in *SimplePages* and exhibits. As a component, the plugin will be well documented from a user's perspective, including screencasts of plugin usage.

Deliverable: This task will take concept and prototype work forward to a releasable *FedoraConnector* plugin for the *Omeka* framework using the FedoraCommons SOAP interface. The plugin will be configurable through an administrative interface and have both written documentation and screencasts to show users how to use the plugin effectively.

TASK 4: BAGIT PLUGINS PLUGIN DEVELOPMENT

General Description: The BagIt plugin will enable *Omeka* to ingest and generate BagIt compliant packages of *Omeka* objects for exchanging digital content between *Omeka* instances.

Detailed Description: This entirely new plugin will require the development of a PHP library for handling BagIt compliant packages based on the current 0.96 release of the packaging format. The BagIt PHP library will be decoupled from the *Omeka* plugin to encourage its reuse in other application development projects. The plugin will leverage the PHP BagIt library to allow *Omeka* administrators to easily import, and generate, packages conforming to the BagIt specification through a simple administrative interface. After the plugin code is complete, the plugin will be documented and a series of screencasts explaining the plugin's usage will be developed.

Organization Responsible: The University of Virginia's Scholar's Lab will assume responsibility for the development of this plugin, with Adam Soroka taking primary responsibility for the design and implementation of the software and Ronda Grizzle overseeing the user documentation and screencast development.

Outcome: The outcome of this task will be a plugin allowing *Omeka* users to both import and export BagIt compliant packages for exchanging generalized digital content. As a component, the plugin will be well documented from an *Omeka* administrator's perspective, including screencasts of plugin usage.

Deliverables: This task will produce two releasable packages, a PHP library for working with BagIt materials and an *Omeka* plugin allowing *Omeka* users to ingest and/or generate BagIt compliant packages for *Omeka* objects. The plugin will be configurable through an

administrative interface and have both written documentation and screencasts to show users how to use the plugin effectively.

TASK 5: NEATLINEMAPS PLUGIN DEVELOPMENT

General Description: The *NeatlineMaps* plugin allows *Omeka* users to use geo-referenced images as “slippy” maps in *Omeka* leveraging the powerful open source Geoserver project for sharing geospatial data.

Detailed Description: Building upon the current code base of the *NeatlineMaps* prototype, this task will refactor the plugin to develop an administrative web form for managing the connections to the Geoserver backend. This task will also allow developers to work on developing a method for producing proxies and passthroughs for the web map service (WMS) API provided by Geoserver. As leveraging geospatial data is a new paradigm for many users in the target *Omeka* user demographic, a series of screencasts will be developed detailing the basics of setting up Geoserver, configuring the plugin, and using the plugin in exhibits and *SimplePages*.

Organization Responsible: The University of Virginia’s Scholar’s Lab will assume responsibility for the development of this plugin, with Adam Soroka taking primary responsibility for the design and implementation of the software and Ronda Grizzle overseeing the user documentation and screencast development.

Outcome: The outcome of this task will result in an improved plugin allowing *Omeka* users to leverage the power of the open source Geoserver project. As a component, the plugin will be well documented from an *Omeka* administrator’s perspective, including screencasts of plugin usage.

Deliverables: This task will produce a plugin for leveraging the Geoserver server architecture from within *Omeka* and easing the administrative configuration of the plugin from within *Omeka*. The plugin will be configurable through an administrative interface and have both written documentation and screencasts to show users how to use the plugin effectively.

TASK 6: NEATLINEFEATURES PLUGIN DEVELOPMENT

General Description: *NeatlineFeatures* allows *Omeka* users to visually manipulate geographic features with simple editor and combine these features with material from *NeatlineMaps* to create even more powerful interactive maps within *Omeka*.

Detailed Description: Improving upon the code base, this task will refactor the metadata standard used to record geospatial annotations from the Well Known Text (WKT) descriptions to the more robust XML grammar provided by the Geography Markup Language (GML). This plugin will also integrate the WFS simple profile within *Omeka*, as well as allow dynamic feature instantiations from within *Omeka*. This will improve the editing interface provided by the plugin

and give *Omeka* developers greater ability to customize the display of geographic entities within *Omeka* themes.

Organization Responsible: The University of Virginia's Scholar's Lab will assume responsibility for the development of this plugin, with Adam Soroka taking primary responsibility for the design and implementation of the software and Ronda Grizzle overseeing the user documentation and screencast development.

Outcome: The outcome of this task will result in an improved plugin allowing *Omeka* users to better annotate geographic map features using well-known metadata standards. As a component, the plugin will be well documented from an *Omeka* user's perspective, including screencasts of plugin usage.

Deliverables: This task will produce a plugin to better annotate geographic features using open standards for geospatial metadata. The plugin will allow users to annotate maps ingested through the *NeatlineMaps* plugin using the GML standard.

TASK 7: SOLRSEARCH PLUGIN DEVELOPMENT

General Description: The *SolrSearch* plugin (now in prototype form) will allow users to replace the default database-based search included in *Omeka* with the popular open source enterprise search platform Solr. *Omeka* administrator will be able to customize how their Solr index is created and searched through an administrative interface.

Detailed Description: Using the Solr-PHP-client library, we will build upon a beta version of a plugin to allow *Omeka* administrators to customize how their *Omeka* collection is indexed and searched, as well as giving theme developers hooks to customize how search results are displayed. This will empower *Omeka* administrators to manage their instantiations of Solr without needing to edit XML files on a server (or cluster of servers), or relying on systems administrators to update server files. As part of the development of this plugin, detailed documentation on indexing strategies and getting Solr up-and-running will be written. As Solr is written in Java and runs in Java servlet containers, documentation for tuning the Java Virtual Machine (JVM) will be written to give *Omeka* users some guidance in optimizing the performance of their index. Lastly, a series of screencasts showing *Omeka* users how to use the plugin effectively will be developed and aimed at individuals administering *Omeka* instances.

Organization Responsible: The University of Virginia's Scholar's Lab will assume responsibility for the development of this plugin, with Ethan Gruber taking primary responsibility for the design and implementation of the software and Ronda Grizzle overseeing the user documentation and screencast development.

Outcome: The outcome of this task will result in a plugin allowing *Omeka* users and theme developers to leverage the power of the open source enterprise search platform within *Omeka*. As a component, the plugin will be well documented from an *Omeka* administrator's perspective, including screencasts of plugin usage.

Deliverables: This task will produce a releasable *SolrSearch* plugin for the *Omeka* framework overriding the default database search behavior. The plugin will be configurable through an administrative interface and have both written documentation and screencasts to show users how to use the plugin effectively.

TASK 8: OMEKA METADATA IMPORT PLUGIN SURVEY

General Description: Several plugins enabling a variety of metadata formats to be migrated into *Omeka* have been developed targeting formats commonly used in cultural heritage and library environments. To expand the set of metadata importers, we will conduct a survey to identify other useful metadata formats that would benefit more community members, particularly in the sciences.

Detailed Description: An online survey will be designed aimed at identifying additional metadata formats the *Omeka* platform should look to handle in the future. Once the questions have been designed, mailing lists will be identified for which to invite respondents in consultation with librarians at the University of Virginia. Once the survey period has expired, the survey data will be analyzed and a report written.

Organization Responsible: Ronda Grizzle of the University of Virginia's Department of Digital Research and Scholarship will assume responsibility for developing the survey and identifying additional potential metadata formats.

Outcome: Through this survey we will identify additional metadata formats that are used by audiences that are not currently supported by *Omeka* plugins. Beyond the collection of this important information, the survey will also provide an opportunity to perform outreach to additional groups who may not know about *Omeka* and its potential uses in their area of expertise.

Deliverables: We will deliver a report of the survey results identifying additional metadata formats, outlining the audience served by the metadata schema, its potential impact, and a prioritized list of importers to develop.

TASK 9: DEVELOPMENT OF EXEMPLAR PROJECTS

General Description: We will develop two exemplar *Omeka-Neatline* projects, in order to insure that the suite of plugins we are developing function well together; are applicable to scholarly use cases; that we have sufficient content available to demonstrate our work at relevant disciplinary

and digital humanities conferences; and that we have ready-made content from which to create helpful screencasts and documentation.

Detailed Description: The *Neatline* project has two ready-made use cases that apply to literary and historical scholarship. The first is a collection of letters of the early 20th-century horror writer, H. P. Lovecraft. Brown University Library has provided EAD metadata for this collection and preliminary work by graduate students and library staff at UVa is underway to assemble and georectify maps relevant to the letters and to link individual letters to geographic features on the maps as a *Neatline* test case. The second project relates to the letters and maps of Jedediah Hotchkiss, cartographer in Stonewall Jackson's Shenandoah Valley campaign. These documents are held by UVa Library and the Library of Congress, and a small clutch of them will provide an historical test case for the *Neatline* plugins. In neither case will these exemplar projects be fully articulated scholarly archives—but they will serve as demonstration websites appropriate to two primary academic communities with interests in the *Neatline* approach and will employ plugins developed as a part of this proposal.

Organization Responsible: Two doctoral students (one in History and one in English) attached to the Scholars' Lab will work under the supervision of Bethany Nowviskie to populate and test these scholarly use cases.

Outcome: Scholars' Lab and CHNM teams will be able to use the Hotchkiss and Lovecraft exemplar projects both in the development process (to test design and interoperability of plugins and core *Omeka* enhancements) and as fodder for documentation and demonstrations of the value of *Omeka* + *Neatline*.

Deliverables: The Scholars' Lab will host and deliver two sample *Omeka* projects using the suite of plugins funded by this proposal.

TASK 10: DISSEMINATION AND SUPPORT

General Description: We will conduct online and in-person outreach and user support to insure the *Omeka* + *Neatline* tools are widely used. This will include using social media channels to reach potential and existing users, conference presentations and workshops, and expansion and continued maintenance of the *Omeka* user forums.

Detailed Description: CHNM's ability to reach institutional and researcher audiences is proven by its long track record of delivering tools and resources to end users. CHNM's websites receive more than 16 million unique visitors each year, and more than one million cultural heritage professionals and scholars use CHNM's tools. We will build on this strong track record for *Omeka* + *Neatline*, harnessing existing audience connections and building new ones. Dissemination of information about *Omeka* + *Neatline* will reach both institutional and individual audiences through announcements to listservs (e.g. Archives & Archivists, DIGLIB,

MUSEUM-L), and H-Net lists. We will also make use of the *History News Network*, a CHNM affiliate that sends a newsletter to 13,000 people three times per week to reach historical scholars in particular. Equally important, CHNM sponsors a number of widely read professional blogs, and these blogs have proven to be a very effective means for rapidly disseminating news to those interested in digital tools. We will also make use of the vast opportunities for electronic social networking available to us, leveraging CHNM, Scholar's Lab, and *Omeka*'s strong followings on Twitter and Facebook. We will present the project at least two times in each year at major conferences, including the Society of American Archivists, the American Library Association, Code4Lib, the National Council of Public History, American Association for State and Local History, Museums and the web, and Coalition for Networked Information. Finally, we will schedule at least two instructional "playdate" workshops for potential users at CHNM's offices.

Organization Responsible: Sheila Brennan at CHNM will coordinate the outreach and dissemination program for *Omeka + Neatline*. Tom Scheinfeldt and Bethany Nowviskie will assist with conference presentations, social media outreach, and blogging efforts. The *Omeka + Neatline* development teams will assist with workshop planning and instruction.

Outcome: At least 50 institutional users of the software and at least 6 new community developers.

Deliverables: Periodic blog and listserv postings, four conference presentations, two instructional workshops, ongoing support in user forums, and improved end-user documentation.

TASK 11: EVALUATION

General Description: CHNM and Scholar's Lab will implement a program of iterative development and evaluation, including unit testing, user surveys, and open lines of communication between project staff and open source user and developer communities.

Detailed Description: CHNM has a long track record of iterative evaluation in software and web development projects, gathering, responding to, and implementing feedback from users, community developers, and other stakeholders at each stage of planning, development, and dissemination. Evaluation of *Omeka + Neatline* will be carried out by CHNM following this model, and will fall into three main categories. First, we will engage in an agile development process that will allow for many points of testing, feedback, and mid-course corrections. As we make changes to the core of the *Omeka* software and build *Neatline* plugins, we will run frequent automated unit testing. We will also solicit volunteers to participate in more informal testing from *Omeka*'s active open source developer community, the cohort of institutions already using *Omeka*, and the community of librarians and scholarly researchers. Second, we will conduct two feedback surveys with users during the course of development, in Spring 2011 and Spring 2012. The results of these two surveys will assist the development teams in considering the needs of end users while development is still underway. Finally, we will maintain open lines of

communication with all of our users. Just as we have in the course of the *Omeka* project, we will maintain a Google group, a project blog, consistent IRC chat hours, and open documentation. Ultimately, our best metric of the quality and success of our effort will be the use of the software we create and the engagement of the community that uses it, and we will keep careful track of and report download numbers, unique visitors to our websites, forum traffic, and exemplary use cases.

Organization Responsible: In coordination with Scholar's Lab, Tom Scheinfeldt and Sheila Brennan at CHNM will oversee evaluation activities for the *Omeka + Neatline* project.

Outcome: *Omeka + Neatline* will deliver a high quality, useable, and used software product and customer experience to scholars and cultural heritage professionals.

Deliverables: Iterative testing, two formal user surveys, open communication channels, usage statistics.

TASK 12: WHITE PAPER DEVELOPMENT

General Description: The Scholars' Lab and CHNM will draft and deliver a white paper outlining the history our partnership and synthesizing our shared experiences in developing *Omeka + Neatline*, resulting in a set of generalized best practices for similar open source software collaborations.

Detailed Description: The white paper will: describe the history of our collaboration and its continuation and broadening under this proposal; detail practical and technical successes and failures faced both individually and together; address specifics of tool development and enhancement and of documentation and developer community engagement; outline a new model of "developer level collaboration" in contrast to longer standing "community source" models; and offer generalized lessons and derived best practices for open source collaborations among academic organizations to benefit other joint scholarly and cultural software development efforts.

Organization Responsible: Responsibility for the white paper will fall equally on CHNM and the Scholars' Lab, with co-PIs Tom Scheinfeldt and Bethany Nowviskie working to collate and synthesize the experiences of project staff in the two organizations, and to place these experiences within the larger context of open source software development in academic and cultural heritage organizations. They will be assisted in research and editing by Sheila Brennan and Ronda Grizzle.

Outcome: We will archive the whitepaper in our respective institutional repository environments, and expect some aspects of its research and synthesis to contribute to formal publications and presentations by project staff, thus furthering its reach into the cultural heritage and digital humanities communities.

Deliverables: This task will produce a formal white paper to be delivered to Library of Congress as part of the final set of outcomes of the project.

8) Deliverables

Omeka and its plugins are released under the General Public License version 3.0 <<http://www.gnu.org/licenses/gpl-3.0.txt>>. All code developed by CHNM and Scholar's Lab during the course of this project will be released under the same or similar open license. All textual products, including documentation and the project white paper, will be released under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 United States License <<http://creativecommons.org/licenses/by-nc-sa/3.0/us/>>.

DELIVERABLE 1: IMPROVEMENTS TO THE *OMEKA* CORE AND PLUGIN ARCHITECTURE

Omeka + *Neatline* will deliver enhancements to the core *Omeka* software upon which the rest of the technical work outlined in the proposal depends. It will add new hooks and filters to the *Omeka* plugin API that will be useful to both the *Neatline* team and third-party community developers in building advanced plugins. In addition, the data intensive work outlined in this proposal will push the limits of the *Omeka*'s existing data model, and the *Omeka* team will make any changes to this model necessary for the completion of the work. Finally, the addition of so many advanced features and changes to the data model will require substantial changes to the *Omeka* administrative user interface and core Exhibit Builder. In each case, these iterative refinements will be made in conversations with the *Neatline* team and the broader developer community to provide them with the broadest range possibilities for future development.

DELIVERABLE 2: *OMEKA* DOCUMENTATION

Omeka + *Neatline* will deliver detailed documentation for developers seeking to build plugins and implement unit and integration tests. All new and improved documents will be freely available and editable by community members on the *Omeka* Codex wiki. New information will include use cases, example code for plugin API elements, information about *Omeka*'s database object system and helper functions as they regard plugins, and documentation on how plugins can interact with *Omeka* on a lower level. The *Omeka* team will also provide plugin developers with detailed instructions and best practices for writing and carrying out testing routines for plugins. This work will be coordinated with quarterly meetings of a "documentation working group" of interested members of the developer community. The outcome will be improved information for the *Omeka* development community on how to develop plugins, resulting in greater participation and higher quality third-party code contributions.

DELIVERABLE 3: NEATLINE PLUGINS

Omeka + Neatline will deliver six production-ready plugins to the *Omeka* user community. This task will take the proof-of-concept and prototype work already conducted by the *Neatline* team to produce production-ready versions of the *FedoraConnector* plugin, the *NeatlineMaps* plugin, the *NeatlineFeatures* plugin and the *SolrSearch* plugin. The *Neatline* team will also produce two releasable packages, a PHP library for working with BagIt materials and an *Omeka* plugin allowing users to ingest and generate BagIt compliant packages for *Omeka* objects. Each plugin will be accompanied by thorough documentation on the *Omeka* Codex. In addition to these plugins, the *Neatline* team will conduct a survey of current and potential *Omeka* users within the scholarly and cultural heritage communities to identify and prioritize a list of additional plugins, particularly metadata importers, for further research and community development.

DELIVERABLE 4: EXEMPLAR PROJECTS

Omeka + Neatline will develop two exemplar *Omeka/Neatline* projects for testing, demonstration, and outreach purposes. The first project will involve a collection of letters of the early 20th-century horror writer, H. P. Lovecraft. The second project relates to the letters and maps of Jedediah Hotchkiss, cartographer in Stonewall Jackson's Shenandoah Valley campaign. These real-world projects will insure the suite of plugins we are developing will function well together and will be applicable to scholarly use cases. They will also insure that outreach staff has sufficient content available to demonstrate our work at conferences and other publicity venues and produce useful, relevant documentation for users.

DELIVERABLE 5: DISSEMINATION AND SUPPORT

Omeka + Neatline will conduct online and in-person outreach and user support to insure the software we develop is widely used and continues to attract a vigorous volunteer developer community. Dissemination activities will include using social media channels to reach potential and existing users, delivering at least four conference presentations, conducting at least two workshops, expanding and maintaining the *Omeka* user forums, and improving end user documentation in the *Omeka* Codex. The result of these efforts will be least fifty new institutional users of the software and at least six new community developers.

DELIVERABLE 6: EVALUATION AND WHITE PAPER

Omeka + Neatline will implement a program of iterative development and evaluation, including unit testing, user surveys, and open lines of communication between project staff and open source user and developer communities. First, we will engage in an agile development process that will allow for many points of testing, feedback, and mid-course corrections. Second, we will conduct two feedback surveys with users during the course of development, in Spring 2011 and Spring 2012. The results of these two surveys will assist the development teams in considering

the needs of end users while development is still underway. Third, we will maintain open lines of communication with all of our users. Finally, the PIs at Scholars' Lab and CHNM will draft and deliver a white paper describing the history of the *Omeka + Neatline* partnership, synthesizing our shared experiences in developing *Omeka + Neatline*, outlining a new model for developer-level collaboration, and proposing a set of generalized best practices for similar open source software collaborations.

9) Management Plan

This proposal brings together a group of experienced partners who can deliver on the ambitious goals of the project. The two lead partners, CHNM and Scholar's lab, will jointly manage the project as a whole. The leaders from the two groups will form a management team who will communicate regularly via email, phone, instant messaging, and in-person meetings.

Though the two groups will share responsibility for the project as a whole, especially its conceptualization, CHNM and Scholar's lab will take on specific areas of responsibilities, and individuals within those groups will have particular areas of focus. CHNM will have the primary charge of ongoing development, documentation, support, and dissemination of the *Omeka* core and plugin infrastructure upon which the other technical components will be built. Scholar's Lab will have primary responsibility for the development of individual plugins and production of demonstration projects. Evaluation and research activities leading to the publication of the project white paper will be carried out jointly.

MANAGEMENT QUALIFICATIONS

CHNM's extensive experience in digital projects equips it to manage the planning, development, assessment, and dissemination of *Omeka + Neatline*. The project builds directly on two core strengths of CHNM: 1) our development of widely used, award-winning open source software for cultural heritage and scholarship, including *Omeka* (recent winner of a Mellon Award for Technology Collaboration) and *Zotero* (named among PC Magazine's "Best Free Software" two years running); 2) our long track record of successful federal grant and contract project management, often in collaboration with large libraries and museums, for example our IMLS-funded *Object of History* project (a partnership with the Smithsonian Institution's National Museum of American History) and our U.S. Department of Education funded *National History Education Clearinghouse*. Scholar's Lab and the University of Virginia Library likewise bring decades of large-scale digital project management experience to *Omeka + Neatline*.

PROJECT STAFF

Tom Scheinfeldt (Co-PI) has nearly ten years experience in cultural heritage, digital humanities, and scholarly software development and has overseen work on dozens of grant and contract projects with budgets totaling \$20 million. Dr. Scheinfeldt will provide executive leadership for the project, including management of staff and budget resources. He will provide strategic and conceptual vision for the project and insure smooth communication between partners at UVa and sponsors at the Library of Congress. With his counterpart at UVa, Dr. Scheinfeldt will have

primary responsibility for project evaluation (Task 11) and research and writing of the project white paper (Task 12).

Bethany Nowviskie (Co-PI) has extensive experience managing technology projects during a decade of experience at UVa. Dr. Nowviskie will provide executive leadership for the project, including management of staff and budget resources at UVa. She will manage day-to-day operations of the team at UVa and will work closely with Dr. Scheinfeldt to facilitate productive communication between the teams in Charlottesville and Fairfax. With her counterpart at CHNM, Dr. Nowviskie will have primary responsibility for project evaluation (Task 11) and research and writing of the project white paper (Task 12). She will also supervise UVa doctoral students building out exemplar projects (Task 9).

Jeremy Boggs is Creative Lead at CHNM and has managed technology development on the *Omeka* project since its launch. Mr. Boggs will oversee software development efforts at CHNM (Task 1), provide user interface design and programming assistance for *Omeka* (Task 1), and have primary responsibility for plugin documentation and support (Task 2).

John Flatness is a trained computer scientist and web programmer with two years working on the *Omeka* core. Mr. Flatness will serve as lead programmer for *Omeka*, including design and development of the plugin API and Exhibit Builder (Task 1), and will assist in developing testing routines and documentation for plugin developers (Task 2).

Sheila Brennan is Associate Director of Public Projects at CHNM and has more than a decade's experience in cultural heritage, including managing end-user outreach for the *Omeka* project since its launch. Dr. Brennan will plan and coordinate dissemination and support of the new software products (Task 10), assist the PIs with evaluation (Task 11), and help research and write the project white paper (Task 12).

Wayne Graham is Head of the Research and Development at UVa's Scholars' Lab with over a decade's experience as a systems architect and software engineer. Mr. Graham will oversee the software development efforts at UVa, assisting in the development of the plugins (Tasks 4, 5, 6, and 7), as well as working closely with Jeremy Boggs at CHNM to ensure smooth technical communications between the two groups.

Adam Soroka is a User Support Programmer at UVa's Scholars' Lab with over 14 years of experience developing in diverse infrastructure environments. He will serve as the lead programmer developing the BagIt (Task 4), the *NeatlineMaps* (Task 5), and *NeatlineFeatures* (Task 6) plugins.

Ronda Grizzle is an Outreach and Training Specialist at UVa's Scholars' Lab with over 16 years of experience in performance-based training, instructional design, and technical writing. Ms. Grizzle will design and interpret the survey of metadata importers (Task 8) as well as assist in

the development of documentation and screencasts for proposed plugins (Tasks 4, 5, 6, and 7). She will also contribute to research and editorial assistance for the whitepaper (Task 12).

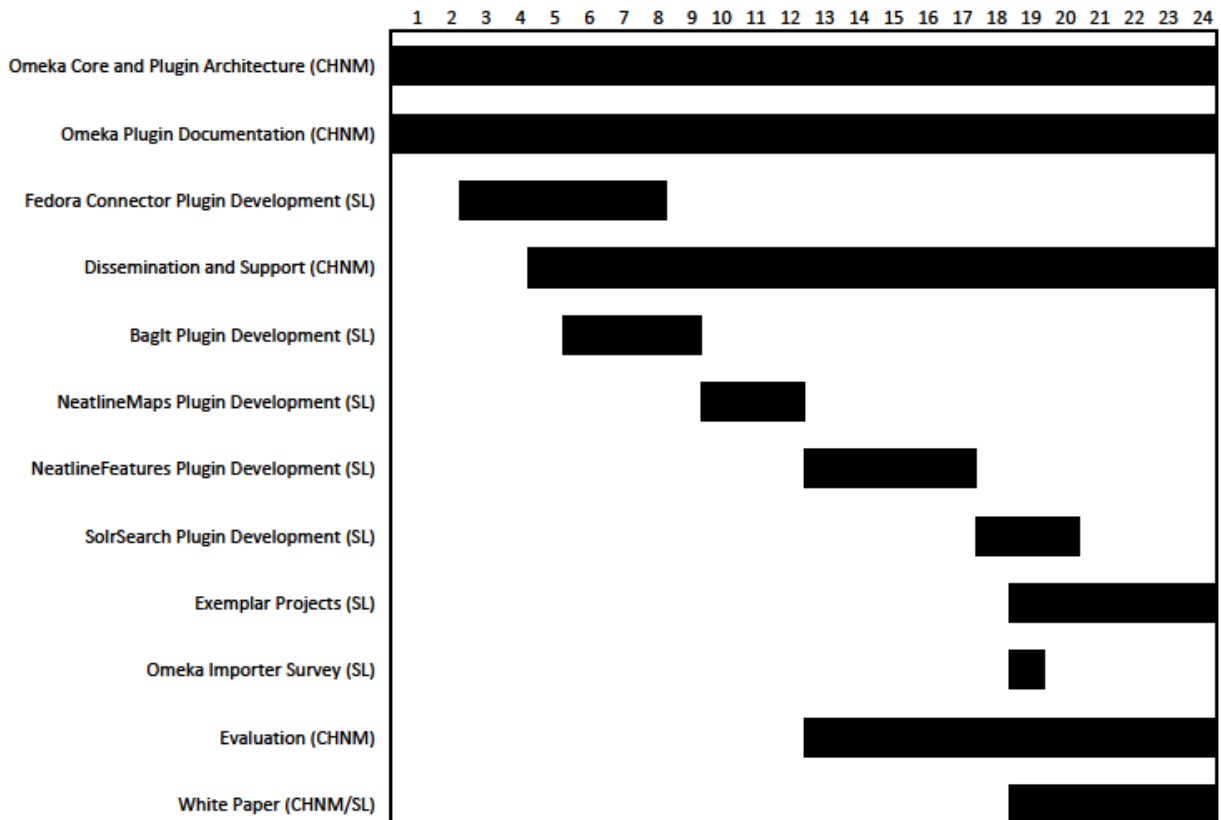
Ethan Gruber is a web application developer at UVa's Scholars' Lab with five years of diverse experience. Mr. Gruber will serve as the lead programmer for developing the Solr Search (Task 7) and contribute to the development the other proposed *Omeka* plugins (Tasks 4, 5, and 6).

COMMUNICATION

Day-to-day work of the project will be managed by way of bi-weekly production team conference calls, periodic consultations with potential audiences for the tools, and frequent communication via email, blog, instant message, and at least twice-yearly in-person meetings at Mason or UVa. Contact with the project's sponsors at the Library of Congress will be conducted primarily through Dr. Scheinfeldt and Dr. Nowviskie in bi-monthly conference calls with principles at the Library of Congress. We will also arrange yearly site visits to both CHNM and Scholar's Lab to give Library of Congress staff a chance to meet and evaluate the workings of the project teams first hand. Open communication among the managers, staff, and sponsors will ensure that we integrate the Library of Congress's ideas and interests into production, and that we meet all of our project deadlines.

10) Schedule and Milestones

SCHEDULE GRAPHIC



DETAILED TASK DESCRIPTIONS

TASK 1: Improvements to the *Omeka* Core and Plugin Architecture (Months 1-24): To support the work of the *Neatline* team and to improve possibilities for additional third-party plugin development, we will work with the community of developers to improve the plugin API, add new hooks and filters that will be useful to plugin developers, update the data model of *Omeka* as required for these new features, and improve the *Omeka* administrative user interface

per feedback from the developer community. We will also add improvements and features to Exhibit Builder for a major 2.0 version release.

TASK 2: *Omeka* Plugin Documentation (Months 1-24): To help *Omeka* plugin developers, this task will expand existing documentation for *Omeka* plugin development. First, we will improve documentation on *Omeka*'s numerous hooks and filters. This will involve adding use cases and example code for the API elements that are already documented, as well as creating comprehensive documentation on how plugins can interact with *Omeka* on a lower level. In particular, *Omeka*'s database object system, which is the key both storing and accessing data in *Omeka*, will be thoroughly documented and explained. Additionally, *Omeka*'s helper functions, which are currently documented with respect to themes exclusively, will be expanded to cover situations where they can be used in plugin development. Finally, this task will provide plugin developers with detailed instructions for how to add automated testing to their *Omeka* plugins. We will also convene quarterly meetings of a “documentation working group” of members of the developer community to help carry out ongoing assessment of *Omeka*'s documentation.

TASK 3: Fedora Connector Plugin Development (Months 3-8): By leveraging the SOAP interface provided by the FedoraCommons infrastructure, we will provide a method for *Omeka* users to use curated objects in their *SimplePages* and exhibits. The plugin will automate the handling of various datastreams (including zero-parameter disseminations) in their description within the *Omeka* framework, as well as Dublin Core synchronization when object metadata is updated in the Fedora repository. The administrative panel for the plugin will provide users with an intuitive configuration interface for managing FedoraCommons target servers, as well as a method to perform batch synchronization of FedoraCommons metadata to *Omeka*. This will help ensure the longevity of media objects used in *SimplePages* and exhibits, with minimal user interaction as digital formats migrated in the future. After the plugin code is complete, the plugin will be documented and a series of screencasts explaining the plugin's usage will be developed.

TASK 4: BagIt Plugins Plugin Development (Months 6-9): This entirely new plugin will require the development of a PHP library for handling BagIt compliant packages based on the current 0.96 release of the packaging format. The BagIt PHP library will be decoupled from the *Omeka* plugin to encourage its reuse in other application development projects. The plugin will leverage the PHP BagIt library to allow *Omeka* administrators to easily import, and generate, packages conforming to the BagIt specification through a simple administrative interface. After the plugin is complete, it will be documented and a series of screencasts will be developed.

TASK 5: *NeatlineMaps* Plugin Development (Months 10-12): Building upon the current code base of the *NeatlineMaps* plugin, this task will refactor the plugin to develop an administrative web form for managing the connections to the Geoserver backend. This task will also allow developers to work on developing a method for producing proxies and passthroughs for the web map service (WMS) API provided by Geoserver. As leveraging geospatial data is a new

paradigm for many users in the target *Omeka* user demographic, a series of screencasts will be developed detailing the basics of setting up Geoserver, configuring the plugin, and using the plugin in exhibits and *SimplePages*.

TASK 6: *NeatlineFeatures* Plugin Development (Months 13-17): Improving upon the code base, this task will refactor the metadata standard used to record geospatial annotations from the Well Known Text (WKT) descriptions to the more robust XML grammar provided by the Geography Markup Language (GML). This plugin will also integrate the WFS simple profile in to *Omeka*, as well as allow dynamic feature instantiations from within *Omeka*. This will improve the editing interface provided by the plugin and give *Omeka* developers greater ability to customize the display of geographic entities within *Omeka* themes.

TASK 7: SolrSearch Plugin Development (Months 18-20): Using the Solr-PHP-client library, we will build upon a beta version of a plugin to allow *Omeka* administrators to customize how their *Omeka* collection is indexed and searched, as well as giving theme developers hooks to customize how search results are displayed. This will empower *Omeka* administrators to manage their instantiations of Solr without needing to edit XML files on a server (or cluster of servers), or relying on systems administrators to update server files. As Solr is written in Java and runs in Java servlet containers, documentation for tuning the Java Virtual Machine (JVM) will be written to give *Omeka* users some guidance in optimizing the performance of their index. Lastly, a series of screencasts showing *Omeka* administrators how to use the plugin effectively will be developed, aimed at individuals administering *Omeka* instances.

TASK 8: *Omeka* Metadata Import Plugin Survey (Month 19): An online survey will be designed aimed at identifying additional metadata formats the *Omeka* platform should look to handle in the future. Once the questions have been designed, mailing lists will be identified for which to invite respondents in consultation with librarians at the University of Virginia. Once the survey period has expired, the survey data will be analyzed and a report written.

TASK 9: Development of Exemplar Projects (Months 19-24): The *Neatline* project has two ready-made use cases that apply to literary and historical scholarship. The first is a collection of letters of the early 20th-century horror writer, H. P. Lovecraft. Brown University Library has provided EAD metadata for this collection and preliminary work by graduate students and library staff at UVa is underway to assemble and georectify maps relevant to the letters and to link individual letters to geographic features on the maps as a *Neatline* test case. The second project relates to the letters and maps of Jedediah Hotchkiss, cartographer in Stonewall Jackson's Shenandoah Valley campaign. These documents are held by UVa Library and the Library of Congress, and a small clutch of them will provide an historical test case for the *Neatline* plugins. In neither case will these exemplar projects be fully articulated, scholarly archives -- but they will serve as demonstration websites appropriate to two primary academic communities with interests in the *Neatline* approach, and will employ plugins developed as a part of this proposal.

TASK 10: Dissemination and Support (Months 5-24): Dissemination of information about *Omeka + Neatline* will reach both institutional and individual audiences through announcements to listservs (e.g. Archives & Archivists, DIGLIB, MUSEUM-L), and H-Net lists. We will also make use of the *History News Network*, a CHNM affiliate that sends a newsletter to 13,000 people three times per week to reach historical scholars in particular. Equally important, CHNM sponsors a number of widely read professional blogs, and these blogs have proven to be a very effective means for rapidly disseminating news to those interested in digital tools. We will also make use of the vast opportunities for electronic social networking available to us, leveraging CHNM, Scholar's Lab, and *Omeka*'s strong followings on Twitter and Facebook. We will also present the project at least two times in each year at major conferences. Finally, we will schedule at least two instructional "playdate" workshops for potential users at CHNM's offices.

TASK 11: Evaluation (Months 13-24): Evaluation of *Omeka + Neatline* will be carried out by CHNM and will fall into three main categories. First, we will engage in an agile development process that will allow for many points of testing, feedback, and mid-course corrections. As we make changes to the core of the *Omeka* software and build *Neatline* plugins, we will run frequent automated unit testing. We will also solicit volunteers to participate in more informal testing from *Omeka*'s active open source developer community, the cohort of institutions already using *Omeka*, and the community of librarians and scholarly researchers. Second, we will conduct two feedback surveys with users during the course of development, in Spring 2011 and Spring 2012. Finally, we will maintain open lines of communication with all of our users. Just as we have in the course of the *Omeka* project, we will maintain a Google group, a project blog, consistent IRC chat hours, and open documentation.

TASK 12: White Paper Development (Months 19-24): The white paper will: outline the history of our collaboration and its continuation and broadening under this proposal; detail practical and technical successes and failures faced both individually and together; address specifics of tool development and enhancement and of documentation and developer community engagement; and offer generalized lessons and derived best practices for open source collaborations among academic organizations to benefit other joint scholarly and cultural software development efforts.

PROJECT MANAGEMENT AND INTERACTION PLAN

CHNM's extensive experience in digital projects equips it to manage the planning, development, assessment, and dissemination of *Omeka + Neatline*. The project builds directly on two core strengths of CHNM: 1) our development of widely used, award-winning open source software for cultural heritage and scholarship, including *Omeka* (recent winner of a Mellon Award for Technology Collaboration) and *Zotero* (named among PC Magazine's "Best Free Software" two years running); 2) our long track record of successful federal grant and contract project management, often in collaboration with large libraries and museums, for example our IMLS-

funded *Object of History* project (a partnership with the Smithsonian Institution's National Museum of American History) and our U.S. Department of Education funded *National History Education Clearinghouse*. Scholar's Lab and the University of Virginia Library likewise bring decades of large-scale digital project management experience to *Omeka + Neatline*.

Day-to-day work of the project will be managed by way of bi-weekly production team conference calls, periodic consultations with potential audiences for the tools, and frequent communication via email, blog, instant message, and at least twice-yearly in-person meetings at Mason or UVa. Contact with the project's sponsors at the Library of Congress will be conducted primarily through Dr. Scheinfeldt and Dr. Nowviskie in bi-monthly conference calls with principles at the Library of Congress. We will also arrange yearly site visits to both CHNM and Scholar's Lab to give Library staff a chance to meet and evaluate the workings of the project teams first hand. Open communication among the managers, staff, and sponsors will ensure that we integrate the Library of Congress's ideas and interests into production, and that we meet all of our project deadlines.

11) Personnel Qualifications and Commitments

Dr. Tom Scheinfeldt, PI - Tom Scheinfeldt is Managing Director of the Center for History and New Media and Research Assistant Professor of History in the Department of History and Art History at George Mason University. Tom received his bachelor's degree from Harvard and his master's and doctoral degrees from Oxford, where his dissertation examined inter-war interest in science and its history in diverse cultural contexts, including museums, universities, and Worlds Fairs. A research associate at the Smithsonian Institution Archives and a fellow of the Science Museum, London, Tom has lectured and written extensively on the history of popular science and the history of museums, most recently two chapters in *Science for the Nation: Perspectives on the History of the Science Museum*, ed. Peter Morris (London: Palgrave, 2010). Scheinfeldt administers all aspects of the Center for History and New Media, an internationally-recognized research center, setting the organization's strategic vision and managing its day-to-day operations. In this role, Scheinfeldt has provided direct oversight of CHNM's diverse research, education, and technology development activities, managing a staff currently numbering more than forty historians, researchers, technologists, and administrators. He has secured government and private grant and endowment funding for these activities in excess of \$10 million (including from the National Endowment for the Humanities, the Institute of Museum and Library Services, the National Historic Papers and Records Commission, The U.S. Department of Education, and the Sloan, Mellon, Kress, and Hewlett Foundations) and administers an annual operating budget of more than \$2,500,000. In addition to these general administrative activities, moreover, Scheinfeldt has conceived, planned, and directly managed several of CHNM's award-winning digital projects—in particular its digital collections projects—including the September 11 Digital Archive <911digitalarchive.org>, the Hurricane Digital Memory Bank <hurricanearchive.org>, the Papers of the War Department, 1784-1800 <wardepartmentpapers.org>, and *Omeka*. In this work, Scheinfeldt has managed collaborations with some of the premier libraries, archives, and museums in the United States and around the world, including the Library of Congress, the Smithsonian's National Museum of American History, the Newberry Library, the Colorado Historical Society, the Minnesota Historical Society, the Museum of the History of Science, Oxford and the New York Public Library, among others. Scheinfeldt blogs at *Found History* <<http://foundhistory.org>> and co-hosts the *Digital Campus* podcast <<http://digitalcampus.tv>> with colleagues Dan Cohen and Mills Kelly. Dr. Scheinfeldt will devote 10% of his time over the course of the award, providing leadership, coordination, facilitating communications, managing CHNM's staff and budget. Dr. Scheinfeldt salary is primarily funded with state appropriated dollars and funds from several active grants at CHNM including: NEH funded One Week/One Tool and Mellon funded THATCamp.

Dr. Bethany Nowviskie, PI - Bethany Nowviskie will devote 10% of her time at the University of Virginia to managing UVa's proposed subcontract over the course of the award, and to the

whitepaper and evaluation deliverables. Nowviskie is Director of Digital Research & Scholarship at the University of Virginia Library and Associate Director of the Mellon-funded Scholarly Communication Institute. She also serves as Vice President of the Association for Computers and the Humanities and is a member of the Modern Language Association's Committee on Information Technology. Nowviskie has worked in the digital humanities in a variety of design and management roles since 1997, with experience in guiding major, grant-funded projects—like the Rossetti Archive and NINES, the Networked Infrastructure for Nineteenth-Century Electronic Scholarship—to successful publication and release. Her 2004 dissertation (*Speculative Computing: Instruments for Interpretive Scholarship*) treated design issues directly related to the construction of digital humanities tools and interfaces like our proposed *Neatline* suite of plug-ins—tools which allow scholars to analyze and express subjective interpretations of archival documents and other cultural materials. As a post-doc and member of UVA's research faculty in Media Studies, Nowviskie conceived and designed the Collex system which powers NINES and its spin-off for 18th-century scholarship, 18thConnect. Since late 2007, she has directed a University of Virginia Library department which includes the Scholars' Lab and Digital Scholarship R&D—energetic units devoted to collaborative work in the digital humanities, building on rich library-managed content, and combining the services of three notable UVA digital centers: the former Electronic Text Center (Etext), Geospatial and Statistical Data Center (GeoStat), the ITC Research Computing Support Center (ResComp). Nowviskie currently serves as PI for two NEH-funded projects related to geospatial scholarship in the humanities. An NEH Start-Up grant which supported early prototyping for *Neatline* comes to an end shortly, and the Scholars' Lab is likewise in wrap-up stages for work related to a year-long NEH-funded Institute for Enabling Geospatial Scholarship. Together, these projects accounted for 17% of Nowviskie's time. A 10% commitment to the *Neatline* Start-Up Grant will end in September 2010, and a 7% commitment to the Institute for Enabling Geospatial Scholarship will end in June 2011. Nowviskie's time is otherwise spent on management of local and departmental projects, with implementation of *Omeka* as a solution for scholarly projects and library-based exhibits being a major departmental priority.

Jeremy Boggs - Jeremy Boggs is the Creative Lead at the Center for History and New Media. He manages software development on *Omeka*, the web publishing platform for cultural institutions. He is also a lecturer at American University, where he teaches courses on digital history in the Public History program. Additionally, Jeremy is currently ABD in History at George Mason University, where his research focuses on design approaches for digital history. Mr. Boggs will devote 40% of his time over the course of the award to the project. The remaining portion of Mr. Boggs' time will be spent on the IMLS funded *Omeka* project and the Mellon funded THATCamp project.

John Flatness – John Flatness has worked at the Center for History and New Media on the *Omeka* project as a web developer and programmer since 2009. He is deeply familiar with the

internal architecture and design of *Omeka*, and the technologies and languages *Omeka* is built upon. Flatness is the chief author of *Omeka*'s OAI-PMH Repository, Reports, and Export plugins, and has contributed to the development of many others. He holds an undergraduate degree in Computer Science from Virginia Tech. Mr. John Flatness will devote 50% of his time over the course of the award as Lead Programmer for CHNM's portion of the project. Mr. Flatness will spend the remaining portion of his time on other grant and contract funded projects at CHNM including the NEH-funded project "Using *Zotero* and TAPoR to Data Mine Old Bailey Proceedings."

Dr. Sheila Brennan - Sheila A. Brennan is the Associate Director of the Public Projects division at the Center for History and New Media. She earned her Ph.D. in history at Mason in 2010. At CHNM, Brennan manages many digital projects and is the end user coordinator for the *Omeka* platform where she works with many museum, library, and archive professionals. Prior to coming to CHNM in 2005, she worked as the Director of Education and Public Programs at the U.S. Navy Museum in Washington, DC for seven years. She has made several presentations on museum education, digital history, and online collecting and archiving. Dr. Brennan will devote 40% of her time over the course of the award to the project. The remaining portion of Ms. Brennan's time will be spread over several contract projects including: The Eleanor Roosevelt Papers, Minnesota Encyclopedia Planning, and the Kress Foundation Summit on Digital Technology.

Wayne Graham - Wayne Graham will devote 30% of his time at the University of Virginia to both managing the day-to-day programming activities of UVa programmers and contributing to the codebase. Graham is the Head of Research and Development in the Department of Digital Research and Scholarship and has over 10 years experience as a systems architect and engineer in digital humanities and higher-education institutions—most notably in the cultural heritage sector at Colonial Williamsburg and in library IT at the College of William and Mary. Trained as an historian, Graham authored the *Facebook API Developer's Guide*, has presented at numerous technical and academic conferences, and designs and teaches a "Programming for Humanists" curriculum offered through the Scholars' Lab at UVa. Time not spent on this project will be devoted to: management of other R&D projects in the Scholars' Lab; migration of our GIS infrastructure and local, UVa Library *Omeka* implementation to centrally-supported systems at UVa; and to his own research.

Adam Soroka - Adam Soroka has been employed as a multimedia specialist and programmer at the University of Virginia Library for 14 years, with extensive experience in UVa's Robertson Media Center and on the Fedora digital library project. In those capacities, he developed a keen appreciation for the needs of faculty and students and the capacity of library technology to contribute to humanities scholarship. Soroka currently works as a User Support Programmer in Digital Scholarship R&D, where he architected UVa Library's open-source, standards-based, web-services approach to the archiving, discovery, delivery, and use of geospatial data. With

Nowviskie, he currently serves as co-PI on the NEH Start-Up Grant for *Neatline*, with a 20% time commitment that will come to an end in the Fall of 2010. Soroka has served as a faculty member on the Scholars' Lab's Institute for Enabling Geospatial Scholarship (a 5% time commitment, ending in June 2011), and has presented on *Neatline* at Code4Lib, the major library programmers' conference, where he also hosted a pre-conference workshop to train other developers on building and supporting a modern GIS infrastructure. His undergraduate degree is in Mathematics from the University of Virginia. The University of Virginia is prepared to commit 50% of Adam's labor to development of this project for the two years of the award. His remaining time will be spent on related work: local, UVa implementation of *Omeka*, *Neatline*, *Fedora*, and the Scholars' Lab geospatial data infrastructure.

Ronda Grizzle - Ronda Grizzle is an Outreach and Training Specialist in the Research & Development division of the department of Digital Research and Scholarship at UVa Library. She is a credentialed librarian who also has 16 years of experience in performance based training, instructional design, and technical writing. On the *Omeka* plugins project, she will contribute her expertise by developing, testing, and refining end-user documentation and screencasts for the plugins created by the Digital Research & Scholarship developers. She will also assist with the editing and preparation of our final whitepaper. 25% of Ronda's labor will be required for this assignment. Her remaining time will be spent on documentation and communications tasks related to the work of the Scholars' Lab.

Ethan Gruber - Ethan Gruber is a web Application Developer in Digital Scholarship R&D at the University of Virginia Library, with a diverse skill set in programming, information architecture, and 3D visualization. Mr. Gruber is a specialist in the creation and dissemination of cultural heritage metadata and an XML/XSLT/XForms developer with over five years of professional experience. In his current research, Mr. Gruber is developing a project named EADitor, an XForms application for managing Encoded Archival Description (EAD) finding aids and has contributed several plugins to the *Omeka* project for importing metadata in several XML based formats, most notably EAD and VRA Core metadata. Ethan will contribute 30% of his time to the project, with the remainder dedicated to working on several *Omeka*-based project collaborations with UVa faculty and library departments.

12) Organizational Experience

We cite here two sets of projects at each of the partnering institutions. Projects at CHNM (*Zotero* and the *National History Education Clearinghouse*) demonstrate its ability to build and support a large open source software project for library users and to responsibly manage large federal contracts. Projects at the University of Virginia Library (AIMS/Hydra and SCI/GeoInst) demonstrate its leadership in software development related to digital library collections and its capacity to connect with a broad community of humanities scholars, librarians, developers, and higher education administrators interested in digital mapping and spatial analysis.

ZOTERO

CHNM is home to *Zotero*, a free, open source, easy-to-use research tool that helps researchers gather and organize resources, and then annotate, organize, and share the results of their research. Funded by major grants from IMLS and the Mellon and Sloan Foundations, *Zotero* includes the best parts of older reference manager software—the ability to store full reference information in author, title, and publication fields and to export it as formatted references—and the best parts of modern software such as del.icio.us or iTunes, such as the ability to sort, tag, and search in advanced ways. Using its unique ability to sense when one is viewing a book, article, or other resource on the web, *Zotero* will—on most major research sites—find and automatically save the full reference information in the correct fields of the researcher’s personal database. *Zotero* users are able to share their collections with other users, collaborate on research projects, send their collections to other free web services (such as mapping or translation sites), and receive recommendations for new resources. *Zotero* is currently used by 1.6 million researchers in over 100 countries, in languages ranging from Arabic to Vietnamese, making it one of the most successful and most widely used open source software projects for scholarship and cultural heritage in any discipline. *Zotero* demonstrates CHNM’s ability to build and sustain high quality, open source software that is useful to and used by scholars and cultural heritage professionals and institutions. It demonstrates CHNM’s ability to disseminate open source software tools, organize and maintain end user and developer communities, provide support to these communities, and respond to user requirements. Finally, *Zotero* demonstrates CHNM’s ability to engage productively with expert library communities and their patrons to build software that helps strengthen the relationship between the two.

NATIONAL HISTORY EDUCATION CLEARINGHOUSE

In 2007, the U.S. Department of Education awarded CHNM a \$7 million dollar contract (ED-07-CO-0088) to develop the *National History Education Clearinghouse* (teachinghistory.org), a free website designed to help K–12 history teachers access resources and materials to improve U.S.

history education in the classroom. CHNM created *teachinghistory.org* with the goal of placing history content, teaching strategies, best practices, current research, and easy access to resources at center stage. We also aimed to bring together the many communities involved in improving history education and professional development for history teachers, allowing practitioners, historians, administrators, and history educators to present multiple perspectives, debate current issues, and work together to improve history teaching in classrooms throughout the United States. CHNM has received excellent performance evaluations from the U.S. Department of Education for our work on *teachinghistory.org*, with special appreciation for organization, reporting, and flexibility in responding to changing needs. *Teachinghistory.org* receives more than 200,000 unique visitors and more than 12 million hits each year and these numbers continue to grow rapidly. The *National History Education Clearinghouse* project demonstrates CHNM's ability to administer large federal technology contracts, to maintain strong working relationships with federal agency sponsors, to respond to sponsor requirements and guidance, to manage large budgets, to deliver on time and on budget, and to provide detailed assessment and reporting information.

AIMS/HYDRA

The University of Virginia Library is the primary institutional home for a Mellon-funded project related to the preservation of born-digital special collections content: AIMS (An Inter-Institutional Model for Stewardship). This is a two-year, multi-million dollar collaborative effort undertaken with Stanford, Hull, and Yale Universities as sub-contractors. When complete, the AIMS project will not only provide working code and curatorial workflows to promote preservation of and access to the born-digital "papers" of notable political and literary figures, but will also result in the development of best practices whitepapers and the nurturing of an online community of digital preservationists based in major research libraries. The AIMS project builds on the experience of the Scholars' Lab and its broader digital humanities community at UVa, as well as on long-standing work on the Fedora digital library system, which was developed at UVa in collaboration with Cornell beginning in 1999. Work on Fedora (now part of the DuraSpace organization) has recently been revitalized at UVa Library with the development and release, by the Scholars' Lab, of Project Blacklight, a customizable, open-source, Ruby-on-Rails-based interface to library catalogs and digital content, including content in robust Fedora repositories. A powerful combination of Blacklight and Fedora has offered a framework for important formal collaborations under the rubric of the "Hydra Project," currently being undertaken by UVa, DuraSpace and the libraries at Stanford and the University of Hull. Among several other dedicated partners in this major open source effort is Johns Hopkins University. (The *FedoraConnector* plugin the Scholars' Lab proposes to test and expand as part of this Library of Congress project allows us to position *Omeka* as a "Hydra Head," thus ensuring that *Omeka* and *Neatline* will function in a "plug-and-play" fashion within the systems of the Hydra partner libraries.) The AIMS and Hydra projects are excellent examples of the growing capacity

of UVa Library to incubate quality R&D projects in the Scholars' Lab and move them into production, while cultivating institutional partners who can help ensure broad uptake and wide applicability within the larger open source community.

SCI/GeoInst

Since 2008 the Scholar's Lab has served as host for two academic programs related to the goals of our current proposal. These are the Scholarly Communication Institute (SCI) – a Mellon-funded think-tank for leaders in higher education and publishing, now in its 8th year – and the Institute for Enabling Geospatial Scholarship (GeoInst), an NEH-funded training program and designed to prepare institutional teams of faculty, developers, and librarians to create and support innovative scholarship using modern GIS tools, web services, and methodologies. Bethany Nowviskie serves as associate director of SCI and is PI on the grant that funds GeoInst. In 2009, SCI focused on advances in the spatial humanities, and in 2010 is exploring experimental publishing and access models for scholarship and primary resources. The training program of GeoInst has just concluded, and the Scholars' Lab is now turning to the creation of a community-based spatial humanities portal, leveraging technology built at CHNM and capitalizing on a groundswell of energy and interest in our work on GIS in the digital humanities. Both of these programs provide the Scholars' Lab with a set of ready-made, meaningful connections to the broader scholarly community and a platform from which to speak to administrators and developers at libraries and digital humanities centers, who are well positioned to evaluate, implement, test, and adopt the *Omeka + Neatline* tools we propose here.