

Enhancing the humanities through innovation

The Maryland Institute for Technology in the Humanities and the Theatre Department at the University of Maryland in College Park want to set up CAMP, a Collaborative, Ajax-Based, Modeling Platform. As the name suggests, this tool is an open source, collaborative, 3d modeler that will allow users with very little experience to generate a 3-dimensional model in their web browser which they can then allow other users to both view and edit. The tool will initially be used to construct an international database of pre-19th century theater buildings, but will be intentionally generic so that scholars interested in structures of any sort can easily port it into their own projects.

CAMP is innovative in its web-based, collaborative approach to 3d modeling, a difficult activity for which there are few tools in or outside of the digital humanities. Until about ten years ago, the average home computer could only process multimedia files relatively slowly, and file sizes and bandwidth speeds prevented the web from being a feasible platform for working with anything other than text and small images. These technical constraints have now largely vanished, however, but work in the digital humanities has yet to catch up with the technical possibilities. The digital humanities remain a largely text-centric field in which most of the largest and best-funded projects in are still those for which a text, usually a significant literary or historical text, is paramount. We hope that CAMP will join the handful of recent NEH-funded startups in multimedial and multidisciplinary areas.

CAMP will initially be used as a component in the *Comprehensive World Wide Digital Archive of Existing Historic Theatres*-- a collaboratively edited, peer reviewed, online database of historic theatre architecture from the Minoan “theatrical areas” on the island of Crete, to the last theatre built before 1815. (The later date coincides with the Congress of Vienna, which dramatically changed the map of Europe, and with the beginnings of Romanticism; both of which led to new directions in theatre building.) Recent scholarship has put increasing emphasis on the places of performance, examining the ways in which space can be manipulated to bring performers and their audiences together. A significant component of such work has been the study of theatre architecture. The Theatre Architecture working group of the International Federation for Theatre Research has begun to examine the ways in which architecture can establish audience expectations, and enhance or limit an audience's experience of a performance. Little attempt has been made, however, to apply these approaches to historic theatre buildings, in large part because of the prohibitive costs of locating and traveling to structures scattered around the world. The *Comprehensive World Wide Archive of Existing Historic Theatres* is an attempt to create the necessary finding aid for these buildings and provide a consistent body of relevant data, most especially digital reconstructions at a consistent scale, about them.

Because of the staggering amount of information, compiling such a database is far too large a task for one editor or even one board of editors. Therefore, the project will be, in the parlance of Web 2.0, “crowd-sourced” to the worldwide scholarly community. Much like Wikipedia, users with no connection to the project managers will be able to create new entries and edit existing ones. Unlike Wikipedia, however, these entries will

be peer reviewed by a board of theater scholars and those determined to meet the editorial standards of the project will be identified as “approved” entries that cannot be modified by anyone apart from the board (although the unapproved, and modifiable, entry will still exist and may provide suggestions for official revisions of the approved entry). Project PI Frank Hildy has recently been asked to head up a Theatre Architecture Working Group that will attempt to catalogue all the existing theatres of Europe for those countries that have not already done so, and this group will populate the database once it is launched.

Such a database would be a significant boon to theater studies even if it consisted solely of text. However, given the 3-dimensional nature of the objects being described, the entries in the database would clearly benefit from accompanying three-dimensional illustrations. Users may, for instance, want to compare the relative sizes of the Roman Theater of Herod Atticus and the Greek theater at Epidauros. CAMP will allow scholar-editors to construct models of both theaters quickly and within the same collaborative framework as the text, thereby permitting other scholars to make such comparisons with an opportunity to respond to and critique the accuracy of the models.

The potential of the tool, of course, extends far beyond this archive. The open source, object-oriented code could be easily repurposed and included in projects completely unconnected with the development team. Set designers working with directors in a different location might use CAMP to sketch up a few ideas that the director could comment on (or even edit) while chatting with her colleague on Skype. Archaeologists could quickly reconstruct long forgotten structures by working as a team to generate a model from data collected from different sections of a dig. A programmer might even build a WordPress plugin out of the code in CAMP, allowing bloggers to construct quick 3d models as an illustration that their readers could edit as a form of comment. In this way, CAMP has the potential to revolutionize not just the scholarly study of the humanities, but also the very nature of the World Wide Web.

Environmental Scan

In many ways, CAMP extends the functionality of Google Sketchup, a free toolkit that allows users to quickly build models that can be easily imported into Google Earth. However, the tool is closed source and therefore dependent on Google for modifications and updates, and also does not permit the sort of real time collaboration that CAMP will provide. Further, unlike SketchUp, CAMP will run in a web browser and will allow multiple users to work on the same model in a wiki-like fashion.

For advanced 3d modeling projects, the open source platform Blender is among the best in its class. It is, however, difficult for beginning modelers to use, is not web-based, and cannot be easily used for real time collaboration. Nonetheless, the code and the developer community of Blender will provide a useful base for our work, and we plan to build conversion mechanisms whereby models produced in CAMP could be imported into that tool.

Linden Labs’ *Second Life* does permit real time collaborative editing, but only in a game-like virtual world housed on servers owned and controlled by a corporation. For many scholars (and, perhaps more importantly, their tenure committees) *Second Life* may

therefore seem an inappropriate venue for disseminating their scholarly work. However, the client side software for Second Life has recently been released into open source, and we plan to use what we can from it as an exemplar for our own modeling system.

The theater database we will create with CAMP will, itself, be a revolutionary resource for theatre scholarship. Although there are several web sites that provide lists of historic theatres and numerous books that document historic theatres in a given region or given country, there is no comprehensive list that provides a consistent body of data on existing historic theatres world-wide. This archive will meet this need and provide a model for other collaborative, peer-reviewed databases.

History and Duration of the Project

In 2007, while conducting an initial literature review for MITH's Soweto '76 project (a 3-dimensional reconstruction of the physical space in Soweto, South Africa in which a student uprising against the Apartheid government of South Africa took place), CAMP co-PI Douglas Reside was struck by the lack of web-based 3d modelers and viewers. Despite the proven popularity of collaboratively generated 3d environments like *Second Life*, few had attempted to place such environments within a web browser. As Reside developed his NEH-funded Ajax XML Encoder (AXE), it became clear that, though the XML generated by AXE was designed primarily for collaborative annotation, the same basic procedures could be used to generate 3d models using a form of XML markup called Scalable Vector Graphics (SVG). Unfortunately, neither the scope of AXE or Soweto '76 allowed for the building of this tool.

In late summer of 2008, world-renowned theatre scholar, Franklin J. Hildy, approached MITH's assistant director, Doug Reside, with a proposal for a database of 3d models of theater structures. For over twenty years Hildy has made a special study of theatre architecture and has conducted many on site examinations of historic theatres in Europe and Asia. He has also worked as a theatre consultant on seven modern theatres and has been an architectural advisor on the reconstruction of the 1599 Globe for the International Shakespeare Globe Center, London. During the course of this work, Hildy gathered one of the most extensive libraries to be found anywhere on the topic of theatre architecture. Reside proposed using AXE to help catalog this library, but, given the inherently 3-dimensional nature of this material, the need to expand the functionality of AXE into the 3rd dimension quickly became clear. Hildy's project provided yet another scholarly use case for this functionality, and so it was decided that MITH would use its AXE to build a CAMP.

The startup phase of the project will last for one year. After this period we plan to apply for an NEH Preservation and Access grant to continue the work and will also investigate whether other funding agencies such as the Mellon foundation may be interested in the project. Mellon has already shown some interest in Reside's earlier Digital Humanities Startup project, AXE, and CAMP is a logical extension of that toolkit.

Work plan

During the startup phase we will produce a working prototype of CAMP and the technical infrastructure for the *Comprehensive World Wide Digital Archive of Existing Historic Theatre*. The theater database will serve as the primary site for both identifying the most needed features of CAMP and for testing and evaluating the initial releases of the tool. By the end of the first year, users of the database will, at minimum, be able to use CAMP to construct a 3-dimensional wireframe illustration to accompany the entries they submit. We imagine these wireframes could be constructed in several ways. In many cases, scholars will have very detailed numerical data about dimensions of the structure. In this case, users need only copy these measurements into an online form and the structure will be constructed as they type. In some cases, though, the user may find it easier to sketch the structure in a guided modeling environment. In these cases, a user could specify URIs for images of all sides of a theater and then, as in Google SketchUp, define vanishing points and trace the structural lines of the building in each picture. From these tracings, a simple wireframe could be constructed onto which the user (or other users) could layer more detailed structural information.

In phase two of the project, we plan, dependent on future funding, to construct the collaborative environment in which users could work on the same model at the same time in much the same way users of Google docs can now simultaneously collaborate on a text document. The algorithms for this sort of functionality are not, of course, all that different than those required for collaborative editing plain text (the models, will, after all, be constructed from SVG text files), but the implementation of this sort of synchronous collaborative editing is outside of the scope of the work we will be able to accomplish in the first year. However, we expect that the immediate usefulness of the tool, even without real-time collaborative functionality, will quickly attract additional funding and we believe collaborative modeling will be possible within the first few months of the second phase of the project.

This modeling interface will be built primarily in JavaScript, HTML, CSS, and SVG (a W3C standard for representing Scalable Vector Graphics that is natively supported in current versions of Safari and Firefox and can be supported via plugin in Internet Explorer). JavaScript will listen for user generated events (such as mouse clicks or key presses) and, in response, will generate SVG XML that will be rendered by the web browser or (in the case of Internet Explorer) via the Adobe SVG Viewer or a similar plugin. The SVG data will also be stored, through AJAX calls to PHP files, in a MySQL database.

The *Comprehensive World Wide Digital Archive of Existing Historic Theatre* will similarly be constructed in HTML, CSS, JavaScript, PHP, MySQL, and SVG. These widely used languages and standards, combined with our open source and modular code, will allow other projects that need a Wiki-like, peer reviewed, database to easily modify or even reuse our code for their own purposes. We will, for instance, store all of the field names for the database in an XML file that can be modified without changing any of the functional code. Another scholar, interested perhaps in created a collaboratively edited database of classical manuscripts, would only have to modify the XML file, change a single configuration setting, and would be then able to set up her own database without ever needing to read a line of JavaScript.

A detailed timeline for our work is below.

April 2009: First project meeting. Reside generates code outline for CAMP prototype and Theater database. Programmer hired.

May 2009-September 2009: Programmer, under the supervision of Reside, implements front end interface for CAMP. Hildy tests and reviews functionality.

September 2009-December 2009: Programmer and Reside continue to revise CAMP in response to Hildy's feedback and connects front end to database. Programmer also implements collaborative database interface.

January 2010-March 2010: Hildy generates at least 50 entries in the database and reports any difficulties. Reside and Programmer respond to Hildy's feedback and debug software.

April 2010: Theatre database launched with prototype modeling functionality

Staff

Franklin J. Hildy (Co-PI) is a Professor of Theatre at the University of Maryland in College Park. He has published 24 articles on theatre architecture and delivered papers at numerous international conferences on specific theatre structures and the way in which the buildings define audiences. As co-author, with Oscar G. Brockett of *The History of Theatre*, a work generally known as the "bible of theatre history," his writing on theatre architecture is read worldwide. In 2002, Hildy was asked to do nine entries on historic theatres for *The Oxford Encyclopedia of Theatre and Performance* and in 2003 was commissioned to do the Theatre Architecture entry for the *Encyclopaedia Britannica*, 2005 edition, and given twice the normally allotted space in which to do it. [Recently, the International Federation for Theatre Research / Fédération internationale pour la recherche théâtrale (IFTR/FIRT) asked Hildy to head up a Theatre Architecture Working Group that will attempt to catalogue all the existing theatres of Europe for those countries that have not already done so.

Douglas L. Reside (Co-PI) is Assistant Director of MITH and a Visiting Assistant Professor of Theatre at the University of Maryland in College Park. Doug holds undergraduate degrees in Computer Science and English and earned his PhD in English at the University of Kentucky where he worked on several digital humanities projects, including Kevin Kiernan's celebrated Electronic Boethius. Since coming to MITH in 2006, Reside has been awarded two Digital Humanities Start Up Grants (the *Ajax XML Encoder* and the *Electronic Broadway Database*). His primary research interest is musical theatre and the way in which digital technology can be used both to create and to preserve the art form. In addition to his managerial, and programming work at MITH, Doug is currently working on a book on the "born-digital" musical.

Web programmer, to be hired at the beginning of the funded period, will be responsible for tools development in JavaScript, PHP, XML, SVG, and MySQL.

Dissemination

The project team will promote CAMP and the database at both digital humanities and theatre conferences around the world. Reside and Hildy will announce CAMP at the national conference of the Association for Theatre in Higher Education (ATHE) in August 2009 and will present their work at the 2010 conference. Reside will present CAMP at the Digital Humanities 2010 conference at Kings College, London and at the September 2010 meeting of the Digital Resources for Humanities and Arts conference in England. Additionally, MITH will promote the project through its web site and listserv, and will submit the code to the open source repository, Source Forge.