

Making Current Spaces of Liberty Hall Museum Accessible through Augmented Reality

Edward Johnston, MFA (PI, Faculty Mentor)

Project Narrative

Scope and Impact

Liberty Hall is an 18th century American historic site built in 1772 in Union, New Jersey. It has been home to several historical figures including William Livingston, a signer of the Constitution, and received prestigious visitors including George and Martha Washington. The main building is not wheelchair accessible and involves multiple staircases. This poses a problem for visitors with mobility concerns who would like to experience the main attractions of the museum.

This project will benefit Kean University and Liberty Hall Museum by providing interactive resources for sharing the museum's rooms and history in an engaging way with off-site classrooms, potential donors, and other visitors who cannot get into the Liberty Hall main building. Also, it will help Professor Johnston formulate new course content related to the interactive design technologies used in this project.

This project will benefit student researchers by providing them with the opportunity to learn several skills and techniques in creating interactive experiences for mobile devices within the design fields. They will learn how to design poster images that optimally function as augmented reality marker images on mobile devices. Also, they will learn how to generate spherical photographs using Motrr's Galileo equipment and Apple devices. Also, they will learn how to create augmented reality content and channels using the Metaio Creator augmented reality software.

The larger design disciplines will benefit from this project's detailed documentation of the methods and techniques of collecting spherical photographs of historic rooms and turning those photographs into interactive augmented reality experiences.

Goals and Methods

Goal1: Collect spherical photographs of the current room configurations in Liberty Hall

METHOD: The visual content of each room will be photographed so that the resultant image of each room can wrap around a virtual sphere. In order to create these spherical photographs, our team will use the Sphere mobile application created by the software developer Motrr on Apple iPod Touch devices. We will be using the Motrr Galileo device that enables precise, spherical photographic documentation of spaces with an Apple iPod Touch. Professor Johnston will show the student researchers how to use the technology in Liberty Hall. He will coordinate with Bill

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Schroh and Rachael Goldberg at the Liberty Hall Museum on scheduling the documentation of each room.

Goal 2: Design vision-based augmented reality marker images, which will be used to activate augmented reality experiences on visitors' mobile devices by optically scanning them through the camera lens on their devices

METHOD: The augmented reality marker images are image-based, quick response (QR) codes that open each augmented reality experience when scanned. These images will be designed in the Adobe Creative Cloud software, which all of the student researchers already have on their student laptops. Professor Johnston will demonstrate best practices for designing marker images, and the students will move forward with designing them. Initial designs will be shared with Bill Schroh to make sure the stylization of the marker images fits with the Liberty Hall Museum's branding.

Goal 3: Create at least one augmented reality channel for the Liberty Hall Museum with the spherical photographs and marker images that will enable people to experience several rooms through iOS and Android devices outside of the building at an accessible location

METHOD: The Metaio Creator software will be used to create the augmented reality experiences, as well as the augmented reality channels to be experienced on mobile devices. Professor Johnston will have one license, and one student researcher will have access to the other license. The finished product will be launched through Professor Johnston's software license.

Goal 4: Test and troubleshoot the augmented reality content on mobile devices for optimal user experience

METHOD: All team members will do this. Metaio's Junaio augmented reality browser is a mobile application that will be used on mobile devices in order to experience the content on those channels.

Goal 5: Provide Liberty Hall Museum with the designed assets from the project

METHOD: Once the project is completed, Bill Schroh at the Liberty Hall Museum will be given digital files of all of the marker images. All project content will be published to a private augmented reality channel, so that the only way to interact with the content is if one has access to the marker images. Then, Bill can decide how he would like to use those for the museum moving forward. The images might fit well in museum booklets and pamphlets, as well as small displays that could be put on a display wall in an accessible building nearby at an accessible height so that visitors could see the content. If there were visitors in wheelchairs, they would be able to hold up

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and point a tablet or camera phone at the wall and move the device around to see the augmented reality experience.

Timeline

June 1 – July 15, 2015:	Collect spherical photographs of the current room configurations in Liberty Hall.
July 15 – 31, 2015:	Design vision-based augmented reality marker images for each room.
August 1 – 15, 2015:	Create at least one augmented reality channel for the Liberty Hall Museum with the spherical photographs and marker images.
August 16 – 31, 2015:	Test and troubleshoot the augmented reality content on mobile devices for optimal user experience. Provide Liberty Hall Museum with the designed assets from the project.
August 31, 2015 or before:	Submit Interim Progress Report.
May 31, 2016 or before:	Submit Final Progress Report.

Faculty Statement

1. How will this project benefit your academic career and research agenda?

This project will benefit my academic career and research agenda by providing me with another creative research project involving the use of augmented reality technologies for the documentation of historic spaces. It will further my writing of academic papers and provide me with an opportunity to share my creative expertise with the Kean community.

2. How much interaction do you anticipate with your students during the course of the project?

I anticipate interacting with my student researchers in person during every documentation session in Liberty Hall Museum. Also, I will be interacting with my students in person during the initial phases of the marker image design process. I will be overseeing all aspects of the project and staying in contact with my student researchers throughout the entire project.

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- 3. Provide a specific description of what the students will be doing during this research activity*

The student researchers will be collecting spherical photographs of the current room configurations in Liberty Hall. They will be designing vision-based augmented reality marker images for each room. Also, they will be assisting in the creation of at least one augmented reality channel for the Liberty Hall Museum with the spherical photographs and marker images. In addition, the student researchers will be testing and troubleshooting the augmented reality content on mobile devices for optimal user experience.

Student Statements

- 1. Describe your preparation or experience related to this project's field of study*

[Student 1] I have over two years of academic experience as a student in the field of graphic design. I have experience with the Adobe Creative Cloud design software including Photoshop, Illustrator, and Muse. I have basic experience with digital photography and introductory experience making basic augmented reality channels using the Metaio Creator interface.

[Student 2] I am prepared to support this project as a student researcher. I am in my senior year of graphic design studies with over five years of graphic design/visual arts studies and two internships in the field. Since starting my studies at Raritan Valley Community College in 2009, I have been learning and using the Adobe Creative Design applications as part of my classes and outside of class too. I consider myself fairly experienced with Illustrator, Photoshop, InDesign, and Muse applications. I have used those programs in my past internship experience with Styling On, a fashion consulting service, and in my current internship with Shark Branding, an advertising and marketing company. I have basic training with digital photography as I took one of my elective courses on digital photography. During this course, I learned the different settings and operation of a digital camera together with the concepts of a photographic composition. I still own and use the digital camera. In addition to creating digital photographs, I know how to manipulate them using the Photoshop application. In addition to the electronic tools of graphic design, I also mastered making visual arts through many different media. My projects were selected for student exhibitions for 3-D designs, typography, illustration, company image/logo, and acrylic/oil paintings.

- 2. How will this project enhance your learning and career goals?*

[Student 1] The AR Liberty Hall project will enhance my learning and career goals by enabling me to learn several skills and techniques within the design fields. I will learn how to design poster images that optimally function as augmented reality marker images on mobile devices. I

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will learn how to create spherical photographs using Motrr's Galileo equipment. I will learn how to create augmented reality content and channels using Metaio Creator augmented reality software.

[Student 2] This project will give me the opportunity to learn skills and techniques related to new technologies such as the Metaio Creator interface and Motrr's Galileo equipment. Learning how to use these new technologies will increase the tools that I have mastered as a graphic designer and will get me better prepared to deal with new emergent technologies in my field. I see these as advantages that I will have and that I can use to market myself as a graphic designer with interest in new technologies. The project will enable me to design poster images that function as augmented reality marker images on mobile devices. I imagine this to be similar to the audio equipment in the big museums that detect where you are and gives you the information on the exhibit. I will be able to learn to create spherical photographs using Motrr's Galileo equipment. The project will also give me the opportunity to create augmented reality content and channels using Metaio Creator software. This will be an exciting part of the project, as it is something very new that I will be able to learn and apply. I see all these skills and techniques as advantages at the time of applying for jobs. I am returning as a student in Fall 2015.