

# **Developing Advanced Technologies for the Imaging of Cultural Heritage Objects**

## **A proposal to the Institute for Museum and Library Services - National Leadership Grants For Museums**

### **Abstract**

Computer imaging technology must be both adapted to and adopted by the cultural heritage community. The audience for this project includes: museums of all sizes, scholars and students of material culture, cultural heritage professionals and the interested public. This project will address their needs: For high-quality, detailed three-dimensional (3D) representations of cultural heritage objects for the purposes of in-depth study and analysis; For facilitation of careful study of cultural heritage objects within a “virtual” context, thus protecting the original artifacts from the deterioration associated with handling and inspection; For easy-to-use tools and equipment for the digital preservation of the detail, shape, color, and reflectance properties of two-dimensional (2D) and 3D cultural heritage objects; For verification of the authenticity of digital objects by accessing the process history. (The process history includes all the information necessary for others to replicate the digital object.) This will assist museums, particularly smaller institutions, in building trusted, digital repositories.

The lead organization for the project, University of Southern California (USC) includes a team consisting of the Archaeological Research Collection (an active USC teaching museum), the West Semitic Research Project (a School of Religion project dedicated for the last 20 years to high-end photography of ancient inscriptions and other material culture), and InscriptiFact (a collaboration between the College of LAS and the Library dedicated to widely disseminating images of ancient inscriptions and other material culture). The USC team has, in the last five years, worked toward the goal of producing high-quality, accurate 2D and 3D digital representations of cultural heritage artifacts using a new technology. The technology, Reflection Transformation Imaging (RTI), was invented by Hewlett-Packard Labs and developed in museum and archaeological contexts by Cultural Heritage Imaging (CHI). CHI is a 501(c)(3) non-profit corporation dedicated to leveraging advanced digital imaging techniques in order to assist others to document culturally significant materials. For this three-year project, the USC project team will collaborate with Hewlett-Packard Labs and formally partner with Cultural Heritage Imaging.

RTI digital images include detailed information about the surface structures of artifacts with relief or texture. RTI digital objects facilitate active interaction with the digital representations. For example, a scholar or student can change the representation’s light source or produce visual enhancements. These capabilities can lead to a significant gain in information.

Currently, RTI technology presents only single views (one surface) of cultural heritage objects. The goal of our research project is to produce photographically based, three-dimensional, multi-view RTI objects, observable from any direction, and to develop easy-to-use tools for the museum and archive community that are complimentary with existing imaging resources and professional cultures. The team intends to produce solutions which will include prototype equipment, software tools, methodology, and procedures for capturing and processing the data. The project will produce a downloadable viewer that can make multi-view RTI digital objects available over the Internet. The RTI digital representations produced will be made available via the InscriptiFact database application.

The project will explore solutions to automatically process the raw RTI data in order to increase ease of use, limit the necessary skill set, and generally simplify the technology for use by the museum and scholarly communities. It will also produce the complete process history for each digital object enabling scholars to independently test the quality of the digital representations through replication and, thus, increase the acceptance of digital archives produced by smaller, less widely known institutions. This project has the potential to set a new standard of best practice for the creation of robust 3D digital representations of cultural heritage material.