

COST Action TD1201 – Colour and Space in Cultural Heritage (COSCH) - Abstract for Working Group Meeting – Mainz, 27th March 2012

3D imaging for museum artefacts: a portable test object for heritage and museum documentation of small objects

Mona Hess, 3D Imaging, Photogrammetry and Metrology Research Group (P3DIM)

3D colour image data generated for the recording of small museum objects and archaeological finds are highly variable in quality and fitness for purpose. Whilst current technology is capable of extremely high quality outputs, there are currently no common standards or applicable guidelines in either the museum or engineering domain suited to scientific evaluation, understanding and tendering for 3D colour digital data.

This presentation will report on the design process, development and use of a new portable test object suited to sensor evaluation and the provision of user acceptance metrics. The test object is specifically designed for museums and heritage institutions and includes known surface and geometric properties which support quantitative and comparative imaging on different systems which support quantitative and comparative imaging on different systems.

Work is on-going to develop the validation protocol in order to provide a practical guideline for evaluating several fundamental imaging principles including: high-resolution 3D colour laser scanning, close range digital photogrammetry, handheld laser scanning and RTI. The supporting protocol will allow object reference data to be included in the data processing workflow and is informed and validated by user testing by museum professionals with specific reference to conservation and curation.

In the medium term we seek to empower CH specialists to be able to provide and exchange precise specifications of the digitizing process for the creation of sustainable and traceable digital surrogates and digital assets which are fit for purpose and augment understanding about the value of their artefacts. This capability will ensure that high end 3D content generation is fit for the intended purpose and that data captured today is sustainable for a wide range of scientific uses into the future.

The research also includes colorimetric 3D recording and display and the development of a method of processing a digital image set captured in a hemispherical RTI illumination dome to extract surface normals by the photometric stereo technique. When combined with the geometry from a 3D laser scanner this enables an accurate and highly detailed digital terrain model to be generated of an object's surface topography.

Author's Biography

Mona Hess is a [Research Assistant at UCL Museums and Public Engagement](#), and PhD candidate in the [Photogrammetry, 3D Imaging and Metrology Research Group \(P3DIM\)](#) at University College London (UCL).

The [P3DIM Research Group](#) in the [UCL Department of Civil, Environmental and Geomatic Engineering](#), carries out a wide variety of scientific and applied research directed towards the acquisition and understanding of precise and reliable measurements of a diverse range of natural and man-made objects and structures. Expertise encompasses the accurate spatial and colour recording of fine art and heritage artefacts, photogrammetric image networks and sequences, vision metrology, laser scanning, range imaging and 3D modelling techniques.

With a background in architecture and heritage conservation, Mona specialized in 3D colour imaging and replica for cultural heritage and museum objects since 2005. She has taken on projects within University College London ([E-Curator](#) "3D colour scans for remote object identification and assessment", workshop 'Life cycle of a digital object'), for museums in London (British Museum - [Solomon Islands Canoe](#), Science Museum, Courtauld Institute of Art) but also internationally (Università degli studi Lecce/Italy, CULTNAT Egypt, University of Virginia/ USA). Currently she is actively involved with the [3DPetrie](#) project at the UCL Petrie Museum.