

Workshop - Ref.: W.1

Topic of the Congress: 5. Scientific examination of heritage and analytical applications using different radiation.

Multi-light Reflectance Technologies: The RTI and PS Techniques for Museum Collections and Field Work

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Abstract: To understanding the physical characteristics of an object one can alter several parameters: what is observed can be moved around; the viewpoint can change its perspective toward the subject or the lighting conditions surrounding the object can be adjusted. The multi-light reflectance approach focusses on the latter method. By illuminating a surface from a number of angles; computer algorithms use this varying data to understand and estimate how every pixel will react in every theoretic lighting condition. It is even able to reconstruct the actual three-dimensional shape of the surface, pixel by pixel. This technique has demonstrated and proven its value in the heritage sector over the last fifteen years for standard imaging; conservation monitoring, decipherment of inscriptions, museum display presentations and many other purposes.

In this workshop attendees will be introduced in two of the most commonly applied approaches when it comes to multi-light reflectance techniques: Photometric Stereo (PS) and Reflectance Transformation Imaging (RTI). Benefits and disadvantages will be addressed; practical experiences will be communicated and discussed. In a second part a groups demo and a practical processing session of the acquired data will aim to allow the participants to deliberate this approach for themselves.

The multi-light techniques are able to register hard to capture details as pretty much no other technology available for the heritage sector can. They present themselves as cost-effective and executable by non-technically trained people. Thanks to the hardware setup, in which commonly used cameras and light sources plays the central role, future updates with better performing equipment gives this approach a technological durability for many more years to come; this includes ultra-high definition photo cameras as well as multi-spectral imaging.

Keywords: Multi-light Reflection; Photometric Stereo; RTI; Multispectral Imaging; 3D Reconstructions

BIO NOTE

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Hendrik Hameeuw is a research fellow at the University of Leuven (Belgium) and at the Belgian Federal Scientific Institute of the Royal Museums of Art and History in Brussels. He graduated as archaeologist (2003) and Assyriologist (2002) and has since specialized himself in the use of new imaging techniques for cultural heritage artefacts and archaeological sites. He has participated in archaeological excavations in Syria for many years and has conducted imaging missions in Egypt, Turkey, multiple places in Europe and the US. Hendrik is member of the steering committees of the Digital Humanities of his university and of Dariah-FED in Belgium.



In collaboration with the department of Electric Engineering (ESAT) at the University of Leuven Hendrik was from the start involved in the development of the Portable Light Dome (PLD) system; the first fully operable multi-light reflectance system using the principles of photometric stereo (PS). He has also used RTI and photogrammetry techniques on museum objects and in the field on rock art sites in Sweden and Egypt. Currently he coordinates a pioneer project for the development of a multi-light system which includes the automated acquisition and visualisation of UV, Bleu, Green, Red and IR light spectra.

BRIEF AGENDA

	22.07.2015	Place
10:00 – 12:30	<ul style="list-style-type: none"> . Introduction . Overview of techniques and tools . Comparison of potential results 	FLUP Sala de Reuniões 2 nd Floor
14:30 – 17:00	<ul style="list-style-type: none"> . Demo and practical session of several techniques and software processing . Discussion and evaluation of techniques 	FLUP Sala de Reuniões 2 nd Floor

NUMBER OF PARTICIPANTS

Minimum 5, maximum 20.

INDICATIONS TO PARTICIPANTS

Participants should bring their laptop on which they have installed or can install [RTI builder](#) and [RTI viewer](#).