

A new perspective on imaging surfaces: the use of Micro Reflectance Transformation Imaging to examine surface topography

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Reflectance Transformation Imaging (RTI) is a well-known technique used to examine and image the surface of a work of art. The technique involves taking multiple photographs of a surface with a digital camera that is fixed in a stationary position, with the angle of lighting changing for each shot. A series of images is generated in which the highlights and shadows vary, depending on the angle of incident light, which ranges from almost axial to steep raking and which traverses 360 degrees around the focal centre of the image. A mathematical model of the surface of the photographed object is generated from the digital images. The resulting RTI file allows the user to view a virtual representation of the surface, in which the lighting angle can be changed interactively. Further options in the software allow the surface's topography and colour to be viewed in an enhanced mode that would not be possible without this technique. The device that will be demonstrated at this workshop was developed by Paul Messier (Boston) and incorporates a microscope, resulting in a Micro-RTI setup that gives us a new tool for examining and visualizing surface textures on a microscopic level. A further development of this technique that will use the calculated normals of the examined surface texture promises to result in an interesting method for 3-D visualization of micro-textures with minimal equipment setup and expense.

Selected references and links

Cultural Heritage Imaging. *Reflectance Transformation Imaging*.

<http://culturalheritageimaging.org/Technologies/RTI/>

RTI Viewer 1.1 download : http://culturalheritageimaging.org/What_We_Offer/Downloads/View/index.html

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