

Final scientific report for the activities in STM for Kaare Lund Rasmussen starting 26.10.2015

My visit to *Istituto per la Conservazione e la Valorizzazione dei Beni Culturali* (IVCBC) at CNR in Sesto Fiorentino, Italy, took place from 26th October 2015 to 6th November 2015. In preparation of my stay we manufactured a set of samples at my research group, *Cultural Heritage and Archaeometric Research Team* (CHART) at University of Southern Denmark (SDU). The samples consisted of upstrokes of modern paint on wood plates, with from 1 to 10 stroke coverage, and with a selection of color pigments relevant for X-ray fluorescence analysis (XRF). At CHART we have a XRF-device from Bruker, an ARTAX-800, which is a semi-stationary 3D motorized device with a polycapillary lens focusing the X-Ray beam to a spot size of 60 micron. On this machine we measured the upstrokes.

While staying at IVCBC, I used their XRF device, a Bruker Tracer III, which is a handheld device with a collimator to limit the spot size. The software used to operate the Tracer III is different from software used to operate the ARTAX-800 (Spectra 7.6.0.0). Getting used to this – for me new - software took me a couple of days. However, at IVCBC they also have the Spectra-software installed on the PC controlling the Tracer III, though without it being able to directly operate the device.

At CHART, we perform a calibration for the XRF measurements in order to produce quantitative and reproducible elemental data. Calibration is done using certified international reference materials of a more or less similar matrix to the object to be analyzed, which works well on thick samples. However, this had not been done at IVCBC, which seemingly was a setback for several research projects presently being conducted at IVCBC.

Consequently, in order to help the research workers at IVCBC and in order to promote the present project, I undertook a calibration of the Tracer III by analyzing several international standards, which research workers at IVCBC either had in the laboratory or procured with short notice in a couple of days from colleagues at other institutions in the Firenze metropolitan area.

At this time, my time at IVCBC ran out. The challenge to make a practical approach to the calibration of XRF data on paintings is still there, although we are now considerably closer to a solution than before this STM.

Workers at IVCBC and I made commitments to visit each other institutions in the near future, and I brought back samples from IVCBC projects to be analyzed at CHART.



Kaare Lund Rasmussen
Odense, 13th November 2015