

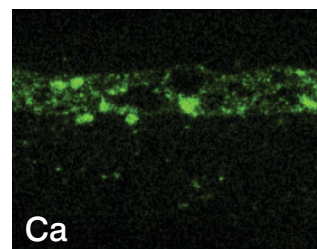
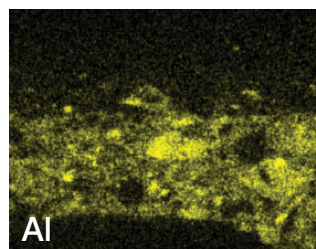
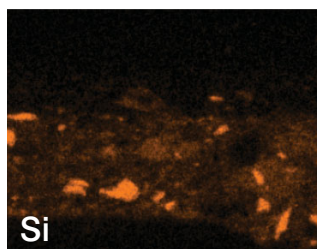
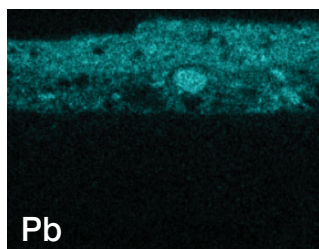
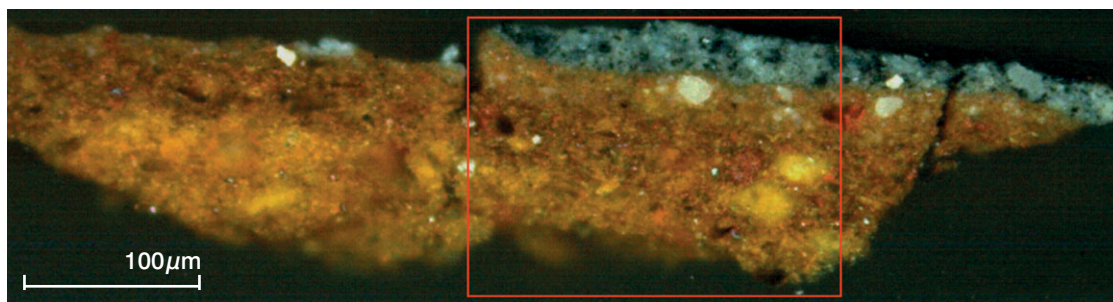
Discovering Artists' Secrets: Rembrandt's Apprentice



Christ and the Women of Jerusalem, Hunterian Art Gallery, University of Glasgow

Technical Art History – A New Area of Scientific Research

Technical art history is a new and exciting inter-disciplinary field. Its methodology, which combines art history with scientific research, is being increasingly used by world leading museums and organisations responsible for preserving the nation's heritage, to develop critical new insights into historical painting techniques and materials and to support conservation activities and authentication. For example, fully understanding the composite materials in paintings is instrumental for their preservation and informs key decision-making about conservation treatments. Accurately identifying composite materials also enables a correct interpretation of the art work, including its appearance, date painted, attribution to a specific artist or school, and thus, potentially, authentication. The University of Glasgow's Technical Art History Group (TAH), in the School for Culture and Creative Arts (CCA), and Imaging Spectroscopy and Analysis Centre (ISAAC), in the School of Geographical and Earth Sciences (GES), can combine their expertise to provide these specialised services to cultural heritage organisations, museums, art galleries, and auction houses.



Tracking Down Rembrandt's Apprentice: Samuel van Hoogstraeten

TAH recently examined a work by the Dutch painter and writer Samuel van Hoogstraeten (1627-1678). Van Hoogstraeten, who was a pupil in Rembrandt's studio in Amsterdam from 1642 to 1646, wrote theoretical and practical art treatises while producing paintings in a wide variety of genres, through which he explored techniques, composition, and perspective. The University's Hunterian Art Gallery owns his *Christ and the Women of Jerusalem* (oil on canvas, 81.3 cm x 64.7 cm), which is signed SvH but not dated. This specific work, however, reflects Rembrandt's style and strong tonal contrasts of light and dark. While little technical research has been carried out on Van Hoogstraeten's own works to date, recent Rembrandt studies are becoming increasingly focused on the Master's pupils.

Identification of 17th Century Painting Materials

TAH's investigation, which was aimed at finding material evidence to date this painting and possibly confirm the presence of the 'Master's touch', involved the detailed analysis of cross-sections of the paint layers. ISAAC's scanning electron microscope (SEM) with energy dispersive X-ray analysis (EDX) offered the means to identify the pigments in the paint and ground layers (i.e., preparation layers on the canvas), to determine if the pigments are mineral or manufactured, and to pick up on additives such as quartz, clay, feldspar, etc. Elemental maps of the paint samples as well as particle morphology provided information on material composition and layer structure. ISAAC's field-emission analytical SEM enabled a high resolution examination of samples without the need for conductive carbon or gold coatings, thus maintaining their integrity for further analysis.

Demonstrating the Master's Influence

For this study, ISAAC imaged samples from van Hoogstraeten's painting. SEM X-ray maps revealed in fine detail the distribution of chemical elements in the paint and ground layers that could be connected to specific pigments and additives. Although these results confirmed the typical 17th Century palette, the painting's ground layers seemed to be quite remarkable. Preliminary results indicated the ground layers contain clays with quartz sand. Due to clay's fine platy structure, they could provide a very smooth surface to work on, but would also be prone to shrinkage and thus cracking. However, the deliberate addition of quartz sand, which was also found in the ground layer cross-sections, would prevent this problem.

This specific type of ground with added sand, applied in a single layer, was characteristic of Rembrandt and has been connected to the tile and pottery industries along the rivers around Amsterdam. Although Van Hoogstraeten applied a second thin ground layer on top, modifying the brownish red colour by adding lead white to the clay mixture, the unusual ground found in the painting indicates that he most likely produced this work while in Rembrandt's studio between 1642 and 1646. Rembrandt began using clay grounds in the early 1640's, and, to date, no similar ground layer compositions have been found in any paintings produced outside his workshop. The Master's touch is indeed present in his apprentice's work.

TAH and ISAAC Scientific Analysis and Expertise – Advancing Artistic Knowledge

The data and subsequent interpretation developed in this study were only achieved through high resolution imaging coupled with X-ray microanalysis and mapping. By combining the expertise of TAH with scientific analysis from ISAAC's state-of-the-art facilities, art history research at the University of Glasgow is breaking new frontiers. The University's specialised service capabilities are now available to organisations, to develop novel data from paintings that offer unique insights, improve understanding, guide interpretation, enable attribution, inform conservation decisions and treatments, and assist with authentication.

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Images

Backscattered electron (BSE) SEM image of ground layer sample with X-ray mapping of key chemical elements