



Technical Research

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The Application of Analytical Techniques to the Chemical Investigation of Daguerreotypes

A collaboration with Western University in London, Ontario is making a new and significant contribution to the study of Canada's 19th-century history by chemically analyzing the surface of daguerreotypes. The daguerreotype was the first commercially available photographic process, which resulted in images of spectacular resolution and clarity.

A silver x-ray fluorescence image (1st image below) shows the detail area depicted in a tarnished daguerreotype (2nd image below) from the National Gallery of Canada study collection.

Using study material from the Canadian Photography Institute collection, Madalena Kozachuk, a PhD candidate at Western University, is using synchrotron radiation to achieve a greater understanding of the chemical and elemental composition of these early photographs. One of the techniques that the synchrotron enables is the collection of high-quality two-dimensional elemental maps. Such techniques show the distribution of chemical elements on the surface.

Even more detailed information can be revealed by analyzing a single pixel in the image to further understand how elements are bonded on the surface. The application of this non-destructive, non-invasive, and non-contact analytical method, and other related analytical techniques, enables a full characterization of the chemistry of the daguerreotype surface, equipping conservators with knowledge to develop preservation methods for these important objects.

Madalena Kozachuk is guided in this work by her supervisors Dr. Tsun-Kong Sham, Dr. Ronald Martin, and Dr. Andrew Nelson at Western University, and Dr. Ian Coulthard at the Canadian Light Source in Saskatoon along with experts from the Canadian Photography Institute.

