Editorial

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Tradition and transgression are two constants in Picasso's creative process. Unlike the works of his youth, which were still dependent on the academic canon, his post-1900 production is defined by the use of heterogeneous materials and pictorial processes, where creative freedom is imposed on orthodox procedures. This reality often confronts conservators-restorers with a complex scenario of dynamic structures in constant metamorphosis, resulting in the greatest challenge of the 21st century, understanding and preventing the degradation of the materials.

This special issue collects the contributions from the international symposium "Around Picasso: An Approach to the Relationship between Materials and Degradation Mechanisms" held at the Museu Picasso in Barcelona (Spain) on November 29, 2018. This multidisciplinary forum, the result of a joint research project carried out by the Picasso Museum, the Polytechnic University of Valencia (Spain), Ca' Foscari University (Italy), Istituto di Fisica Applicata Nello Carrara (Italy), Queen's University (Canada) and the Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation (Denmark), aimed to correlate the chemistry of materials with mechanical damage in the paint layers.

Mecklenburg provided the framework for the symposium with an overview of his 30 years of research on the structure of paintings and the effects of the environment on their mechanical behaviour. Taking the principle of superimposition as a guide, Mecklenburg dissected each layer and gave insight into the mechanical and dimensional properties of painting materials, their response to temperature and relative humidity as a consequence of thermal and swelling coefficients, the effects of pigment-medium interactions, and the interplay between the layers during film forming, drying and aging.

Eumelen and her colleagues complemented this mechanical approach to painting failure by using computational modelling to study the formation and growth of metal soaps in historic oil paintings. Researchers investigated the effect of saturated fatty acid concentration and initial nucleus geometry on the resulting chemo-mechanical degradation such as cracks. These factors were found to be marginally influential on growth rate, but had a significant effect on the extent of fracture.

After this panoramic view of the mechanical and chemical aspects of painting degradation, several case studies were presented. Focusing the symposium on a single artist allowed a thorough understanding of Picasso's painting technique and insight into the behaviour and interactions of his materials over the years. Jimenez Garnica and her colleagues analysed paintings from the collection at the Museu Picasso in Barcelona among which was one of the museum's most iconic paintings, *Science and Charity*, as well as four paintings created by the artist in 1917, during his stay in Barcelona. All paintings demonstrated alterations resulting from the mechanical interaction between materials, thus leading to a discussion of how the choice of materials can result in significant differences in stability over time.

The contribution of Jimenez Garnica focused on the background and conservation history of the painting

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Science and Charity. For decades, severe cupping and flaking were evident on the painted surface, probably the combined effect of the artist's material choices and the environment. The painting also showed traces of past invasive conservation treatments carried out in an attempt to stabilize the paint layers (such as the interference of textures from the combined use of temperature, moisture and pressure in a lining performed in the 1970s). This paper presents the multi-analytical study carried out in 2017. Results obtained from infrared reflectography, high-resolution, multi-band images and colorimetry informed the conservation strategy and illuminated Picasso's creative process in his late academic years.

Fuster-López and her colleagues presented the research on four 1917 canvas paintings by Picasso in Barcelona, which showed significant differences in degradation patterns, despite similarities in canvas, paints, palette and execution techniques. The large diversity in the nature of the degradation patterns indicated differences in composition that had not been found in previous analyses. To understand the synergy between the failure mechanisms and to design suitable preventive conservation strategies and treatments, the multi-analytical approach adopted included X-ray fluorescence spectroscopy (XRF), fibre optic reflectance spectroscopy (FORS), micro-Fourier transform infrared spectroscopy (μ-FTIR) and gas chromatography-mass spectrometry (GC–MS).

Buti and his co-authors investigated the painting *Acrobat Family*, owned by the Gothenburg Museum of Art. The material components of the painting were identified using nondestructive techniques which were instrumental in revising previous inaccurate information and demonstrated why areas were faded or discoloured. The techniques included visible and infrared imaging, near infrared false colour images, XRF, FORS, and external reflection FTIR The binding media Picasso used in the work included a waxy compound, a drying oil and possibly a polysaccharide compound. Light exposure had caused the Prussian blue pigment to fade and the acidity of the cardboard support had instigated the discolouration of the ultramarine.

Imai and her colleagues shed light on Picasso's working method and the history of the painting *Mother and Child by the Sea*. They determined when the work was transported from Paris to Barcelona in January 1902, by using hyperspectral near-infrared reflectance imaging to investigate the imprint from a newspaper made when the painting was wet. The authors also made comparisons with two other paintings from the same time period.

Langley and her colleagues studied the Art Institute of Chicago's painting *Still Life* (1922), in order to answer conservation-related questions. This led to a greater understanding of the materials and technique employed in this painting. Through pyrolysis–gas chromatography-mass spectrometry, researchers found a copal-containing medium in the paint that Picasso had added to create smooth, glossy, fluid stripes. Depending on the paint layering and the different drying rates, these lines eventually wrinkled in localized areas, sometimes leading to tenting and paint lifting. Conservation treatment strengthened these areas and showed the surface effects and textures that Picasso had originally created.

A multi-analytical approach allowed Pouyet and his colleagues to find the palette of pigments used in Picasso's *La Miséreuse accroupie*, owned by the Art Gallery of Ontario, as well as the pigments in previous compositions beneath this painting. Changes Picasso made to the final image indicated aspects of his working method. The techniques used by the researchers included non-invasive methods, including scanning macro-XRF (MA-XRF) and FORS, as well as methods to analyse cross-sections such as scanning electron microscopy-energy dispersive X-ray spectroscopy, μ-FTIR, and micro x-ray diffraction; links were also made to previous imaging campaigns, x-radiography and photometric stereo imaging, that captured the underlying compositions.

Shank described the discovery of a second painting under *Scene de la Rue (Rue de Montmartre)*, owned by the San Francisco Museum of Modern Art (SFMOMA), and suggested the history of the work that was painted in 1900. Colours from the hidden painting could be seen beneath the drying cracks in the upper painting. Through collaborations with the National Gallery of Art in Washington and techniques including infrared reflectography, x-ray radiography, and binocular microscopy, an approximation of the image of the lower painting was revealed. This image is similar to the contemporaneous painting *Moulin de la Galette*, owned by the Solomon R. Guggenheim Museum in Bilbao.

Townsend and her colleagues evaluated the light sensitivity of a unique collage in the Tate's collection, *Bottle of Vieux Marc, Glass, Guitar and Newspaper* 1913. Microfading and other investigations characterized the light sensitivity of the components of the collage that included handmade paper, *broderie anglaise* pattern pieces, water-resistant flock wallpaper and old newsprint. This research allowed a display protocol to be developed for the work of art. The paper gave an overview of the complex condition and ongoing research related to the piece, and ended with still unanswered questions with respect to fading and display.

To conclude, the editors would like to thank the Museu Picasso and the different research institutions involved, as well as the specialists from museums, universities and research institutes worldwide for their generous participation in the symposium. Sharing the

most recent research disseminates a more full appreciation of Picasso's work, as this collection of papers clearly demonstrates.