

5th Ulrich Schiessl PhD Colloquium

Academy of Fine Arts and Design in Bratislava (AFAD)

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Book of Abstracts



V V VYSOKÁ ŠKOLA VÝTVARNÝCH
V F UMENÍ V BRATISLAVE
> S V ACADEMY OF FINE ARTS
V D AND DESIGN IN BRATISLAVA

ENCoRE's PhD Colloquiums have been held since 2008 and were first known as *The Oranienbaum Colloquium*. After the sudden and unexpected death of Prof. Ulrich Schiessl (one of ENCoRE's founding members) in summer 2011, the Board of ENCoRE decided to rename the colloquium -in honour of its initiator-, to *Ulrich Schiessl PhD Colloquium*.

The aim of the colloquium is to give postgraduate research conservation students the opportunity to present and discuss their current research with their peers and programme faculty, and to benefit from such an exchange. It will allow sharing of ideas and information amongst PhD candidates and programme faculties in an informal environment. The colloquium seeks to create a European forum for debate and exchange of ideas in research with relevance to the conservation-restoration of cultural heritage. Furthermore, it provides a venue for PhD students to meet, interact and form future collaborations with their peers. The colloquium is open only to current PhD candidates of all specializations in conservation, their supervisors and other academic staff involved in research training in the European conservation programmes of member institutions.

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Provenance Analysis of Artistic Materials Used in The Mannerist Decoration of Bratislava Castle.

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ABSTRACT

In the spring of 1962, during the comprehensive renovation of Bratislava Castle, a remarkable discovery was made – in the thickness of the wall in the south-eastern corner, the remains of well-preserved Mannerist fresco and stucco decorations were found. Based on archival documents, we can today say with certainty that this exceptional artistic realization was executed between 1563 and 1565 by three Italian artists.

In the context of the authorial attribution, archival records mentioning court painter Giulio Licino (1527 - 1591) are of particular significance. Licino was responsible for the interior decoration of the chapel at Bratislava Castle for Ferdinand I and Maximilian II. Additionally, three other artists from Italy— Plinio Scarpelli, Jacopo Pastorini, and Antonio Ponzano —were invited to contribute to the decoration of the so-called "bay window".

Of these three painters, Plinio Scarpelli is of special interest due to his connection with 16th-century Venice, where he worked on various projects, including the decoration of the Palazzo Grimani di Santa Maria Formosa. In this endeavour, Maestro Plinio collaborated with Giovanni da Udine, a known associate of Raffaello Santi. As is well known, Venice was, at the time, a major centre for the trade of art materials, particularly pigments. This leads us to the question of the origin of the pigments used in the Mannerist decoration of Bratislava Castle.

The doctoral thesis focuses on comprehensive material analysis with a specific emphasis on the provenance analysis of art materials, particularly aluminosilicate-based pigments, used in the Mannerist decoration of Bratislava Castle. Through a combination of invasive and non-invasive methods, followed by comparing the obtained data with available reference material databases, this research aims to better understand the circulation of art materials, along with artists from the Italian environment to our region (present-day Slovakia).

Since the Mannerist decoration have undergone previous conservation interventions, our primary aim was to focus on areas with the greatest degree of intactness of the original. In the first stage, we

mapped the elemental composition of the pigments using pXRF (Niton XL3 Thermo Scientific), Raman spectroscopy (Bravo Bruker), and colorimetric analysis. Based on the interpolation of the measured data, appropriate sampling locations were then selected.

Within the sampling, we focused especially on earth pigments, which constitute the main component of the fresco decoration's colour scheme and are of irreplaceable importance for provenance analysis. The samples were then subjected to further methods, primarily XRD/XRPD analysis, to identify the crystalline phases of the pigments used. By correlating mineralogical data with historical sources, we aim to identify geologically specific markers that may clarify the provenance of these pigments. The initial phase of our ongoing study has revealed valuable information about the composition and technological characteristics of the pigments, more specifically, aluminosilicate-based materials used in the Mannerist decoration of Bratislava Castle. In the next stage of the research, these results will be compared with measurements made in the Italian environment, primarily targeting the Venetian region (Palazzo Grimani di Santa Maria Formosa).

Painted Decorations in Jan Kasprowicz High School in Inowrocław as an Example of Interior Decoration in Secondary School Buildings' Representative Spaces from the Second Half of 19th C. in the Former Province of Poznań

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ABSTRACT

Schools belonged to the most frequently constructed public utility buildings in 19th c. The history of education and the development of individual institutions established in the territories of partitioned Poland have been the subject of numerous monographs. What also attracted researchers' attention was school architecture from this area and time. However, the interior decoration of 19th-century school buildings remains a topic with a relatively low degree of historical recognition.

The research project focuses on the analysis of the interior decoration of representative spaces in secondary school buildings from the second half of 19th c. in the former Province of Poznań. The study concentrates on identifying the original artistic concept, technique and technology, as well as conservation problems related to the preserved painted decorations.

The author will discuss detailed results of the research conducted in one of several objects included in the project – the former Gymnasium in Inowrocław, today forming part of the complex of Jan Kasprowicz High School No 1 with Bilingual Branches in Inowrocław. The building was erected in 1859, and the discovered polychrome decorations were created in 1860. Since then, its representative interiors – the assembly hall and the main entrance hall (vestibule) – have undergone numerous modernisations, renovations, and transformations with regard to functionality and – in the case of the assembly hall – architecture. Before the research began, the earliest wall and ceiling decoration of the former school assembly hall remained unknown to the public. A number of stair- and strip-type test uncoverings carried out in the room enabled accurate sampling which, in turn, allowed the identification of grain structure of the plasters, components of the painting palette, and the binders. The conservation research, confronted with relevant literature and preserved archival materials, made it possible to trace the history of the original interior decoration and attempt a reconstruction of its appearance in the form of a visualisation.

The Neo-Renaissance architecture of the Inowrocław building, together with references to classical art forms visible in its interiors, are unique (yet not the only) among other school buildings from the second half of 19th c. in this region. The interior decoration carries significant historical, artistic, and aesthetic values. The author will also present photographs of other preserved wall paintings or their uncovered fragments from selected secondary school buildings included in the project.

Many school buildings from that period have not survived in their original form. Some were severely damaged during wartime, demolished, or completely rebuilt. Today, besides obvious destructive factors such as water damage, human activity continues to contribute most significantly to the degradation of school buildings and their interior decorations. Low public awareness and their purely utilitarian view promote renovations, reconstructions, and extensions that all fail to respect their historic essence.

The research results will broaden our knowledge of the interior design of representative spaces in secondary school buildings from the second half of 19th c. in the former Province of Poznań, allowing these structures to emerge in public consciousness as valuable cultural assets that shall be protected.

The Potential of the Broken: A Systematic Survey of Archaeological Wall Painting Fragments

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ABSTRACT

As part of our cultural heritage wall paintings are important testimonies to human history. Through their materiality and the way we perceive them, they convey traditions, technical knowledge, and the zeitgeist of aesthetics. They also provide insights into external forces as well as give evidence of a building's construction and conservation history. But what about wall painting fragments found ex situ? How do we perceive these objects? Do they convey other values compared to wall paintings still attached to the wall? Does their decontextualization allow for a different use? And if so, are we dealing with them in a sustainable and responsible way?

A large and continuously growing number of ex situ wall painting fragments are being unearthed and collected during archaeological excavations. Their context, e.g. from cultural heritage sites which no longer exist, are endangered or inaccessible, or can no longer be sampled, makes them a unique and non-renewable resource. Despite this and the extent of such archaeological collections only a small number of individual fragments are made accessible and used for presentation, academic and research purposes. The fact that only a fraction of wall painting fragment collections is used, bears the long-term risk of dissociation and the complete loss of information and value, which greatly threatens the preservation of this cultural heritage resource. To address these issues, a doctoral research has been initiated, which is presented in this paper. It aims to contribute to the interface between archaeology and conservation by systematically investigating the potential of collections of archaeological wall painting fragments and by assessing the risk they are exposed to. It focuses on the aspects of their evaluation, management and use as cultural assets. It points to the need for an ethical discourse to guide the decision-making process of selecting fragments for different purposes and to recognise their value. It explores how archaeological wall painting fragment collections can be made available and their potential as academic research resources promoted in the context of societal transformation.

The present research uses a combination of methods including a literature review, a questionnaire survey, and a case study of a collection from Virunum. A comprehensive review of existing literature will explore the cultural, historical and aesthetic significance and valuation of archaeological wall painting fragments. Their potential and influencing factors will be assessed through published examples, the questionnaire survey data and the case study. The case study will further serve to understand how existing tools, e.g. the Statement of Significance and ethical guidelines, can be used to evaluate and manage these objects and related data. Finally, it will enable the engagement with different interest groups to understand the challenges and opportunities associated with these cultural assets and to identify the risks that such collections face. By comparing current practices and ethical guidelines, the research aims to identify the need for aids and recommendations.

Based on the results, a preliminary framework will be developed, which may assist in using and managing collections of archaeological wall painting fragments sustainably and in selecting fragments for various use cases.

Development and Validation of a Simplified Method for Assessing the Injectability of Grouts Used in the Conservation of Historic Masonry

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ABSTRACT

The present study constitutes a methodological contribution that forms a parallel part of a broader PhD research project. The overarching objective of the present project is to assess the impact of cellulose ethers and other organic additives on the characteristics of injection grouts employed for the preservation of historical plasters and masonry. In the field of practical applications of grouts, injectability is a pivotal property that must be assessed reliably and reproducibly. The development of a reliable and reproducible method for assessing this property was therefore a prerequisite. The methodological framework utilised facilitates objective comparison of different formulations and serves as a foundation for systematic testing and optimisation in the main phase of the research.

Injection grouting represents a pivotal technique in the conservation and restoration of historic plaster layers and masonry. The purpose of the method is to restore cohesion and adhesion between detached layers, fill internal voids and cracks, and ensure the long-term stability of surfaces. The efficacy of grout injection is contingent not only on its chemical and physical compatibility with the substrate, but also on its injectability, defined as its capacity to penetrate porous structures without clogging, segregation, or excessive water loss. Existing methods for assessing injectability are frequently intricate, encompassing numerous variables and challenging interpretation. While such complexity can simulate real conditions, it can also make direct comparison between formulations more complicated.

The objective of this study was to design and verify a simplified injectability testing method that allows for rapid, reproducible comparison of different grout mixtures while minimising interfering factors. The core of the proposed procedure is a model capillary environment made of glass beads and precisely defined fractions of glass microspheres. The system is entirely inert, thereby negating the effects of substrate absorbency and chemical interactions. The assessment is centred on the capacity of the grout to traverse the model without forming plugs, and on the observation of its behaviour during flow, as opposed to the measurement of flow time. Concurrently, a needle flow test was conducted utilising needles with predetermined internal diameters. This facilitates a simplified correlation with capillary dimensions and enables practical classification of mixtures according to their capacity to traverse narrow channels.

A selection of commercial grouts – namely, LEDAN®, PLM-A – and lime putty were subjected to testing at varying water-to-dry component ratios. These ratios encompassed both the manufacturer-recommended values and extreme values, with minimum and maximum water contents, in order to observe the behaviour of the grouts under different rheological conditions. The mixtures were evaluated using predefined classification scales. The findings demonstrated that the proposed method can distinctly differentiate between mixtures based on their capacity to penetrate a model simulating the capillary network of historic materials. The simplified test was found to be reproducible, technically uncomplicated, and straightforward to interpret. The method is therefore considered a preliminary and complementary tool that facilitates the selection of mixtures for subsequent comprehensive laboratory and in situ testing.

Methodological Problems of Presenting Surface Treatments on Exterior Stone Sculptures

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ABSTRACT

The dissertation project deals with the methodology of restoration and presentation of surface treatments on exterior stone sculptures, focusing on their visual and cultural interpretation. In Slovakia, and in Central Europe in general, exterior stone sculptures are a very common type of monument that is an integral part of public spaces. This type was most widely used from the Baroque period (17th century) to the beginning of the 20th century.

These are mainly sacred motifs – statues of saints, Marian and Trinity columns, and calvaries. Most of these works were superficially treated with a monochrome paint layer or polychrome in the past. However, due to long-term exposure to climatic conditions and purist restoration approaches, these layers have been preserved only in exceptional cases. Today, stone sculptures are mostly presented in exposed stone material, which fundamentally changes their original artistic and ideological character.

The aim of the project is to find suitable methods for presenting coloured surface treatments on stone sculptures and to determine an appropriate restoration methodology.

The paper presents the results of research focused on evaluating restoration practices in Slovakia. Restoration projects from the mid-20th century to the present are examined. Specifically, restored works and the methodologies used in their restoration are examined – from the complete removal of the coloured layer, through partial reconstruction, to complete reconstruction of the probable original appearance. Selected works allow us to trace the development of sculptures over time – from their original form with a paint layer to their current form after a series of restorations.

The article addresses the following questions:

- How has the visual appearance of the work changed?
- What was the significance of the coloured surface treatment in the past and what is its significance today?
- How has the understanding and interpretation of the object changed?

The key question remains the choice of a suitable restoration methodology: is it more important to preserve the current appearance of the statue, marked by historical interventions, or to strive to reconstruct the colour layer to its hypothetical “original” form?

The article also outlines possibilities for alternative presentations of surface treatments, which are the subject of further research within the dissertation.

The Development of Internal Condition Assessments for Archaeological Metals Using Computed Tomography (μ CT)

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ABSTRACT

Traditional condition assessments of archaeological metals

Everyday condition assessments of archaeological metal objects rely largely on visual observation combined with the conservator's experience and theoretical knowledge. As such, the condition assessments of metal artefacts are based on personal interpretations of the general appearance of the outer surface of objects and assumptions about their inner nature. The only approach that readily provides information about the inner nature of the object is x-ray imaging. However, the information acquired through surface examination and 2D x-ray images may not be sufficient to provide a thorough assessment of an object's bulk material or the extent of phenomena that are occurring within it.

Condition assessment based on the inside of an object

The surface of an object is of paramount importance to understand its use and cultural significance, yet most of the object still lies beneath the surface. The condition of the bulk material is thus of equal importance to support this surface, without which the surface becomes fragile, detached and evanescent. Metal artefacts are particularly prone to post-excavation subsurface degradation. After excavation and treatment, degradation of the bulk material may still proceed in storage and if not monitored, go unnoticed until the object breaks up and falls apart. This project turns the focus of condition assessment to the inner, bulk material of the object and explores the use of computed tomography (μ CT) for non-invasive condition assessment.

Corrosion phenomena and monitoring of change

μ CT, accompanied by scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM-EDS) and μ Raman are used in this research to study objects made of copper alloy and iron to assess the use of μ CT scanning as a tool for conditions assessment, assessment of treatment effectiveness, and long-term monitoring.

The copper alloy case study investigates corrosion phenomena within the bulk of the object that may be recognized by μ CT. This then enables visualization and tracing, and thus provides the means to make a quantified assessment of the condition of a given object.

The iron object case study - the focus of this presentation - considers μ CT as a tool to assess treatment effectiveness and long-term monitoring of minute changes to an objects' inner structure. For this, discarded archaeological iron objects were exposed to an artificial environment optimized for iron carbonate crystal growth, which may prevent future corrosion. Results show the ability of μ CT to visualize and quantify loss of, and changes to, the remaining metallic core of an object. These changes were not detectable by visual examination of the surface nor by 2D x-ray examination. They were observed at the surface of the remaining metallic core, beneath the corrosion crust. The outer, orange layer of the corrosion crust was removed to reveal the original surface before exposure. The remaining inner, gray corrosion layer covering the metallic core was largely unaffected by exposure to the artificial environment. This paper discusses and contextualizes these results, in addition to the development of the applied μ CT methodology.

Modern Conservation and Restoration of Antique Picture Frames

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ABSTRACT

The professional conservation and restoration of fine art objects – paintings, polychrome sculptures, objects made of paper, leather, stone, ceramics, and metal – has been a mainstream conservation practice for decades. As a result, many issues in this field have been researched, research findings disseminated and accepted within the community, and appropriate standards have been developed. This state of affairs does not however apply to many works of applied art, such as picture frames, which are the author's primary focus and will be discussed in her planned doctoral dissertation.

In her presentation, the author will present a draft of her doctoral dissertation on theoretical and practical issues related to the conservation and restoration of historic picture frames.

Picture frames are often multi-technological objects. Working with them requires knowledge and familiarity with the nature of working with functional historic wood, paint layers, gilding layers, and other processes most often associated with the conservation and restoration of historic furniture. The presentation will include a discussion of various examples of techniques and technologies used to create picture frames over the centuries, such as woodcarving, specific painting techniques, gilding techniques, imitation techniques, wood varnishing techniques, and other decorative techniques, such as inlay, veneering, encrustation, and marquetry.

The presentation will also address conservation doctrine – the ethical principles guiding the conservation of historic objects, with particular emphasis on historic frames and functional objects made of wood. Next, historical methods of frame restoration and conservation will be discussed, with a focus on contemporary practices, which make proper, ethical frame conservation a rare phenomenon. The current state of frame inventory methods will also be presented, using selected Polish museums and institutions as an example, along with conclusions drawn from the research.

The practical part of the doctoral dissertation will involve a conservation inventory of one of Poland's collections of historic frames from various historical periods, as well as the conservation and restoration of three of the most valuable frames selected from the collection. Conservation and restoration work will be based on the principle of minimal intervention, translating its complexity into the conservation of functional works of art. During the work, the author will pay particular attention to issues related to the safe cleaning of gilding layers, replenishing missing primers (gessoes) and so called "compositions" (moulding pastes), emphasizing the reactivation of original moulding pastes and the proper filling of missing wood veneers and facings, as well as the durability of wood paints and stains and the reintegration of finishing layers (polishes, varnishes or lacquers).

The author's primary goal is to define the principles and standards for modern conservation and restoration of picture frames, to draw attention to the existing problem, and to change the trends among art conservators, framers, restoration technicians, and the broader community of artists and craftspeople regarding the treatment of historic frames. One of the goals of her planned doctoral dissertation is to develop a template for an inventory card for historic frames and then make it widely available.

The author hopes that her observations and preliminary, introductory analysis of the issue will prompt an attempt to define a research methodology and, in the future, undertake in-depth research on the aforementioned issues, which, in her opinion, require the most urgent attention.

An Insight into Crack Mechanisms in Modern Oil Paintings: The Anglada-Camarasa's Collection as Case Study

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ABSTRACT

Nowadays unnoticed behind the prominence of artists such as Picasso and Miró, Hermenegildo Anglada-Camarasa (1871–1959) achieved wide international acclaim in the early 20th century with a distinctive style shaped by Modernist and Impressionist roots, later enriched in Paris by Post-Impressionist, Fauvist, and Expressionist influences. The chromatic force and vibrant materiality of his painting secured his recognition across Europe and America, yet his withdrawal to Mallorca and years of exile due to the Civil War led to the gradual marginalization of his work, ultimately confined to a local sphere.

This PhD research focuses on the study of the 25 canvas paintings of the Anglada-Camarasa's collection belonging to "la Caixa" Foundation and located in Palma de Mallorca (Spain). The study aims to identify degradation mechanisms on the pictorial surface. Through non-invasive analytical techniques such as multiband imaging (MBI), micro-MBI, colorimetry, and fiber optics reflectance spectroscopy (FORS), the research is aimed to gain a deeper understanding of the artist's technique and materials and to provide tools for the re-evaluation of Anglada-Camarasa's contribution to the artistic landscape of the time¹.

One of the main objectives of this PhD research is to document the painter's collection using non-invasive analytical techniques. In this contribution, the early results of a first on-site mission will be presented. The results allowed the observation of stylistic aspects but also an in-depth exploration of Anglada-Camarasa's technique and the identification of degradation mechanisms on the paint film. Specifically, it was possible to observe and record crack patterns present in most of his works, which could be related to the materials used.

¹ This PhD thesis is part of the CRACK project as a recipient of the PhD grant PID2023-148300NB-I00 funded by MICIU/AEI/10.13039/501100011033 and by ERDF/EU.

It is known that Anglada-Camarasa belonged to a period in which new pigments were introduced to the market (e.g.: pigments based on zinc, cadmium, or titanium), and artists' experimentation was common practice. The observation of the paintings with digital microscopy allowed for a detailed examination of the cracks previously identified through visual observation and MBI techniques across different weave lengths. During the examination, it was observed that some cracks formed only on the surface, while others originated in underlying layers and were not yet visible to the naked eye. These results allowed evidence how the various materials applied in different layers within a given painting can result into different failure phenomena observed on the painted surface, and also in different degradation patterns. This research also evidences that the examination using different wavelengths can help in the estimation of potential crack development in the future.

The next stages of this research will be focused on determining whether these crack phenomena are induced either by environmental conditions, by the intrinsic properties of the materials themselves, or by the interaction between materials and ambient conditions. The study of a group of paintings from the same given artist is always an extraordinary opportunity of identifying trends in the artist's material choices, and their role in the damage phenomena observed.

Adhesion and Penetration of Water-based Adhesive Meshes for Canvas Bonding

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ABSTRACT

Adhesive meshes are specifically designed for bonding fragile painting canvases that require stabilisation with a secondary textile support. These micro-structured, flexible meshes are produced using pure, water-based adhesives, such as methyl celluloses in two viscosity grades (Methocel™ A4C or Methocel™ A15LV), or sturgeon glue. Once dry, the meshes are positioned in place and activated using a controlled supply of water. After activation, the parts are joined under pressure until dry. This technique provides an exceptionally uniform distribution of the adhesive throughout the bonding surface and enables permeable and reversible bonding. As such, it ensures minimally invasive and highly controllable treatment. By varying the activation parameters, the strength of the adhesion can be manipulated, ranging from slight tack to remarkably high strength. If a painting can tolerate temporary moisture, this technique offers an appealing alternative to traditional adhesives such as acrylic dispersions and hot-melt adhesives, as it does not require heat or organic solvents. Several case studies have demonstrated the practical applicability of this technique in strip linings, full linings, and the re-attachment of failing historic linings along the edges.

Adhesive meshes originated from a diploma project at the Dresden University of Fine Arts (HfBK Dresden) in Germany. They were further investigated within a research project at the Bern University of Applied Sciences in cooperation with APM Technica AG, both in Switzerland, and the HfBK Dresden. As a result, APM Technica has commercialised adhesive meshes for conservators. The PhD project based in Dresden aims to systematically research canvas bonds using available adhesive meshes, comparing them to those using BEVA® 371 films. The properties investigated include adhesive strength, the penetration of adhesives into the canvas, and long-term behaviour. For this purpose, improved spray and heat activation, as well as a standardised bonding and tensile testing procedure, were developed. This allows individual parameters, which have since been shown to be decisive factors for the quality of the adhesive mesh bond, to be examined: the adhesive itself, the amount of water used for activation, and the temperature during bonding.

The project's technique and outline were first presented at the Ulrich Schiessl PhD Colloquium in 2019. This contribution focuses on preliminary results and draws conclusions regarding the relationship between the adhesion and penetration behaviour of the adhesives. It allows for a deeper understanding of the general adhesion mechanism of canvas bonds.

The Influence of the Incorporation of Natural Biocides into Adhesives : Is it Possible to Achieve a Biocide and Painting Consolidation Double Effect?

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ABSTRACT

Fungal biodeterioration represents one of the most critical challenges in oil-on-canvas painting conservation. Owing to its complexity, fungal activity can affect the painting both chemically, through the release of enzymes and fatty acids, and mechanically, via the mycelium penetration into the painting strata. These processes lead to binder degradation, colour alteration, and structural damage. Structural damage may be exacerbated under environmental conditions favourable to fungal growth (above 70% HR and 28-30°C), which also affect the dimensional and mechanical stability of oil-on-canvas painting materials, particularly animal glues used for sizing. In severe cases, the combined effects of mycelium and weakened glues from sizing and ground can result in painting detachment. This situation requires both biocidal and consolidation treatments, which are typically applied separately. For biological control, various mechanical, physical and chemical methods (biocides) have been developed, with the latter being the most employed by conservators. However, the use of synthetic biocides involves risks for humans and the environment. In recent decades, essential oils (EOs), natural biocides derived from plants, have been explored as safer, eco-friendly alternatives for cultural heritage biocontrol. Meanwhile, consolidation is achieved using natural or synthetic adhesives. When applied sequentially, these treatments may compromise painting stability: applying the biocide first (generally by mechanical action) can weaken adhesion, whereas applying the adhesive first can provide additional nutrients for fungal growth. This PhD project explores the incorporation of EOs (tea tree, clove, oregano and thyme) into consolidation adhesives for oil-on-canvas painting, aiming to achieve a dual biocide and consolidation effect. The main challenge lies in the immiscibility between EOs and

the water employed as a solvent in adhesive dispersions (gelatine, Plextol B500® and Aquazol 200®). To overcome this, the emulsion inversion point (low-energy emulsification method) was used to incorporate the biocide into the adhesive matrix. Preliminary phases of the study involved the EOs characterisation by Gas Chromatography – Mass Spectrometry (GC-MS), the determination of the Minimal Inhibition and Fungicide of the selected EOs and EOs emulsions against *Aspergillus niger*, *Aspergillus westerdijkiae* and *Penicillium chrysogenum* strains isolated from oil-on-canvas paintings. In addition to assessing the biocidal performance of the formulated adhesives, their physicochemical and morphological properties were examined by Fourier-transform Infrared Spectroscopy (FTIR), colourimetry, pH measuring, peeling tests, stress-strain assays and High-Resolution Field Emission Scanning Electron Microscopy (HRFESEM). Although the research is ongoing, results indicate that EOs exhibit higher antifungal activity than the commercial biocide used as reference (Biotin T®). Moreover, their incorporation into the adhesives, despite including some variations, remains within acceptable safety ranges in terms of colour, pH, mechanical and adhesion properties.

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Retouching in the 21st Century: Methodological and Technological Visual Integration of Artworks

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ABSTRACT

The doctoral research focused on the possibilities of visual integration of artworks addresses the issue of retouching within the context of the technological and ethical paradigm shifts of the 21st century.

The project builds upon a historical reflection on the evolution of retouching approaches, their theoretical foundations, and practical transformations. It aims to formulate both a terminology and a methodological framework for visual integration at a time when digital technologies and algorithmic systems are becoming equal partners to traditional conservation-restoration practices, yet their forms have not been clearly defined.

The primary objective of the research is to formulate a methodology of visual integration that, through the application of digital technologies and ethically grounded procedures, redefines the concept of retouching in contemporary restoration practice.

The research interconnects the traditional ethical principles of conservation – reversibility, transparency, discernibility, efficiency, and proportionality of intervention – with the current potential of digital tools and machine learning methods. It explores how precise data models and visual simulations can optimize decision-making processes in retouching while preserving its critical, aesthetic, and philosophical dimensions. Retouching is a discipline whose ethical and aesthetic principles must be reflected from the very beginning of any research or practical intervention. However, current practice still lacks a coherent methodology that would fully integrate modern technological capacities into the decision-making processes of restoration, enabling their application without compromising the ethical or artistic integrity of the discipline.

Methodological Framework of the Research

The project employs an interdisciplinary approach combining results from chemical-technological, non-destructive, and digital analyses. Based on these outcomes, visual models and algorithmic systems are developed to enable precise planning of the extent and type of retouching, while simultaneously fostering professional dialogue among conservators restorers, curators, technological experts, and commissioners. Particular attention is devoted to the boundary between human and machine interpretation of artworks, addressing the question of authorship in both external and self-referential interventions, and redefining the role of the conservator as a creative mediator between the original work and its contemporary perception. The aim is not to replace professional judgment with technology, but to develop supportive digital tools and methodological frameworks that enhance qualified, ethically grounded decision-making in the process of retouching.

Didactic Dimension of the Research

The didactic dimension of the research translates its theoretical and methodological foundations into practical application. The project focuses on designing new educational strategies and clearly defining the competencies required for working with digital technologies in the field of conservation-restoration.

The educational outcomes will include a set of multimodal learning materials – textbooks, video tutorials, podcasts, and recordings of practical training sessions – designed to foster professional and critical thinking among future conservators and to strengthen their digital literacy within the ethically sensitive context of retouching artworks.

The project thus represents a synthesis of theoretical grounding, technological innovation, and ethical responsibility – three pillars upon which a new culture of visual integration of artworks may be established in the 21st century.

Semantic Databases in Art Conservation: Challenges and Solutions.

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ABSTRACT

This PhD project aims to develop a non-invasive, open-access diagnostic tool for the assessment of the condition of easel paintings. The objective is to create a resource of practical and scholarly value for researchers, conservation professionals, and students in the field of painting conservation. The development of the tool comprises two principal components: first, the systematic compilation of multiband imaging techniques into a structured image library; and second, the creation of a database integrating these images with previously developed ontologies. The use of ontologies will enable the structured organisation of information related to case studies and their associated pathologies.

In recent years, the integration of computer-based tools into Cultural Heritage (CH) documentation processes has gained increasing prominence. This trend is driven by several factors, including the capacity to store large volumes of data, to facilitate the sharing and transfer of information between researchers and institutions, and to ensure immediate and continuous access to documentation. However, this integration also presents a number of challenges. The most significant among these is the requirement for specialised IT expertise to develop, maintain, and update the necessary systems, as well as to ensure their long-term storage and sustainability.

Another major challenge concerns the development of systems that are resilient to technological obsolescence. While this can be partially addressed through the implementation of recognised standards and open-source resources, such efforts may ultimately prove ineffective without continuous maintenance and active strategies to enhance visibility and adoption. Furthermore, the use of established standards and open-source tools can promote compatibility and interoperability with other systems, thereby contributing significantly to the mitigation of near-term obsolescence.

Several approaches may be adopted to address these challenges. One such approach involves the implementation of an ontological solution through the creation of a semantic knowledge base based on the CIDOC Conceptual Reference Model (CIDOC CRM; ISO 21127:2023), which has gained increasing recognition within the CH domain. Developed specifically for the structured organisation of CH entities, the model is capable of encompassing a wide range of subject matter within the field. Nevertheless, its integration into the present PhD project presents specific challenges. As the project focuses on the creation of a database dedicated to easel painting pathologies, the artworks themselves assume a secondary role in the semantic interpretation. Consequently, the original structure of the model requires further development and adaptation to meet the specific objectives of the research. To this end, the project employs a modified version of the Erlangen CRM/OWL implementation of the CIDOC CRM within the WissKI (Wissenschaftliche Kommunikationsinfrastruktur) open virtual research environment for data management.

This ontology-based system will provide an optimal framework for organising data for subsequent use, including analytical comparison, dissemination, and knowledge transfer. When combined with multiband imaging, it can function as a non-invasive diagnostic tool for the assessment of easel painting pathologies, as well as an educational and training resource for professionals and students in the CH field.

A Paper Conservator Approach to the Material Study of Red Colours in Chinese Woodblock Prints From Two Ming and Qing Painting Manuals.

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ABSTRACT

This PhD thesis is a study of the red colouring materials found in Chinese woodblock prints of the Ming and Qing periods, mainly through several editions of two illustrated books, the Ten Bamboo Studio and the Mustard Seed Garden manuals of painting. Our corpus is made of 15 books, all from the collections of the French national library (bnF) in Paris.

It is conducted in the context of a "thesis by the project" opened to conservators and supported by the INP, in the CY university EUR (Ecole Universitaire de Recherche) frame.

Three main concerns are at the core of our PhD project and they relate to how, as conservator, we deal with conservation science data and studies. First, material studies on Chinese woodblock prints are rare in the international literature and conservation practices are, at best, adapted from the Japanese woodblock prints guidelines. Second, we need practical, user friendly and affordable methods and technics to apply in everyday work. Third, the broader our knowledge of different materials and object typologies, the better. This means that single object studies are useful reference materials but collection studies are far more informative, giving the conservator a better idea of the landscape behind an object.

Technically, woodblock prints from our corpus are, for the most part, simple and colour mixing might be the exception. They are a good material to test our methods. Furthermore, the corpus is composed of 151 prints in black and red colour only, simplifying analysis and most of illustrations are represented in three to five versions, through different editions

We planned a two-part experiment beginning with testing on mock ups the characterization methods available to us, mainly through colour appearance attributes. We aim to be able to construct a practical differentiation tree between colouring materials. This preliminary phase conducted, we will come back to our corpus to test and confirm our hypothesis on actual patrimonial objects.

Thus, our presentation will focus on the scientific and practical approach we are now following.

Philatelic Collections in Polish Institutional and Private Collections. Research, Conservation, Current State of Knowledge and Challenges

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ABSTRACT

Philatelic collections are organized sets of small-scale artefacts related to the history of postal communication. They are created for hobbyist, documentary, or investment purposes. In private collections, stamps are arranged thematically according to the type of issue, main motifs, plate proof, or printing errors. Interest in philately emerged after 1870, shortly after the first postage stamp issue. Stamps withdrawn from circulation became collectible items whose value continues to be determined by the philatelic market. Despite their small size, their degradation poses a serious challenge for both museums and private collectors.

Institutional collections, unlike private ones, also serve a documentary function. They include graphic designs, proof prints, and test prints made on various types of paper. Stamps may occur individually or as parts of larger sheets. Although their production history is relatively short, postage stamps display great diversity in terms of technique and technology. Various papers, adhesives, and printing inks were used and combined in numerous ways, giving each issue unique characteristics and significant philatelic value.

The research and conservation issues were presented using selected philatelic items from 1920–1939 originating from both museum and private collections. Three groups of objects were examined: sales sheets, stamps mounted on historical exhibition cards, and loose stamps stored in album sheets. Their common feature is a complex material structure and high sensitivity to environmental factors. Unlike most paper-based objects, a single postage stamp bears a layer of reactivated adhesive (so-called gum) on its reverse, which significantly complicates conservation procedures.

To protect stamps from deterioration, philatelists often rely on outdated conservation publications dating back several decades. These sources sometimes recommend obsolete or even harmful methods from the perspective of current conservation knowledge. Another problem is the use of self-devised analytical approaches by collectors attempting to identify printing techniques, which may lead to irreversible damage. At the same time, art conservators rarely undertake work with philatelic items, discouraged by their material complexity and the lack of established methodological standards.

Ongoing degradation of stamps and the absence of safe, well-developed methods for their study and conservation highlight the need for interdisciplinary cooperation among conservators, museum professionals, and scientists. The conducted research revealed difficulties in both the analysis of printing techniques (microchemical and instrumental) and in assessing the condition of the material, for example during pH measurement of the paper or colorimetric registration of the substrate.

Within the framework of the project, possibilities and limitations in conducting basic studies on the manufacturing techniques and preservation state of postage stamps were presented. The methods and potential of micro- and macroscopic imaging of stamp surfaces were discussed, as well as the challenges associated with identifying the components of printing inks, paper, and adhesive layers.

Magnetic Mounting of A0 Drawing on Paper: Towards Adjustable and Reversible Support Systems

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ABSTRACT

Magnetic systems are important in conservation and display practice due to their strength, reversibility, and potential to replace invasive or damaging traditional methods such as nails, clips, pins, or adhesives. Their capacity to store high energy density in small volumes offers new possibilities for handling and stabilizing supports. Nevertheless, conservation practice still lacks systematic research into the safety, control, and applicability of magnetic systems across different substrates and artistic materials.

As part of the doctoral research, this contribution presents the development of a magnetic mounting pad designed for large-scale paper supports, tested on an A0 drawing. The proposed system consists of two plates (900 × 1250 mm) with embedded cavities (150 × 25 × 2.5 mm) holding 24 movable cylindrical neodymium magnets (D20/L2 mm). Unlike fixed corner systems, this arrangement allows magnets to slide along all sides and diagonals, enabling flexible mounting of substrates of varying sizes. The magnets are stabilized by thin ferromagnetic elements, while point-specific mechanical force can be calculated using an online tool developed in cooperation with the Encyclopedia Magnetica project.

Preliminary calculations and experiments confirm that a single magnet generates a force of approximately 4 N across a 1 mm non-magnetic gap (equivalent to the thickness of the sheet to be mounted). Accordingly, the cumulative force of 24 magnets can exceed 90 N. These magnetic elements can be easily removed by lifting them off the underlying magnets. While the total force is substantial, it can be distributed and selectively applied, reducing the need for maximum loading in standard practice.

This case-study is supported by an online calculator, which enables further research and allows users to determine the sufficient holding force for any given magnetic element, depending on magnet type and the thickness of the sheet to be mounted. Adjustability makes the system suitable for large paper supports, canvas stretching and temporary exhibition mounts requiring reversible stabilization.

The study also addresses safety concerns. The proposed mounting system operates passively, without external power supply, and does not exceed recommended international exposure limits for static magnetic fields (ICNIRP 2009). Risks related to magnetic interactions with pigments, graphite, or other magnetically responsive materials are minimized by maintaining appropriate spacing between the magnets and the surface. Current findings indicate the system provides secure and reversible mounting without introducing permanent stress or deformation to the support.

This research forms part of a broader doctoral project focused on designing, testing, and validating magnetic solutions for conservation and display. Ongoing work includes: (1) developing adjustable magnetic holders with variable pressure for treatment applications, (2) testing the use of magnets for canvas stretching and auxiliary supports, and (3) analyzing the interaction of magnetic fields with stratigraphic layers and paint materials.

Expected outcomes include safe, adjustable magnetic mounting systems; conservation guidelines; and data on magnetic field effects on materials. By bridging technical design with conservation needs, this research aims to expand the repertoire of reversible, non-invasive methods available to conservators and to provide museums and cultural institutions with validated tools for safe object handling and exhibition.

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Notarial bindings in Greek Archives and Libraries. Comparative Study, Materials Technology and where Research, Science and History meet.

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ABSTRACT

This PhD research project aims to study archival bindings that have received little attention from researchers in the past. They usually have simple yet stable binding structures, with a wide opening spine to serve the demanding needs of gradual recording practices of administrative, economical, legal or other interest.

Among the different bindings used for archive purposes, notarial ledgers are of significant historical value since they constitute evidence of the original documents of legal acts (deeds, contracts etc.) they contain, and for this reason they were carefully preserved. The materials and techniques used for the construction of these bindings with certain structural characteristics, along with the storage conditions involved, were crucial for the long-term preservation of the codices.

The research questions focus on notarial bindings in Greek archives and libraries, dating from Sixteenth to the Nineteenth century, with the objective to record and classify the different types of binding structures, to detect possible styling influences and to assess their present condition focusing on the damages associated with the binding structure. For this purpose, field surveys are taking place in the Central Services of the General State Archives of Greece, in Athens as well as the regional archives of Corfu, Kythera, Kefalonia, Lefkada, Chios, and the library of the Greek parliament, where notarial archives were detected.

In the ongoing research, a survey form for the documentation of the bindings is used to collect data concerning: the manuscript identification, codicological elements, the textblock (type of paper, watermark etc.), the inks used for writing and indexing, the materials and technique of the binding, and the particular binding features. A section of the survey form is dedicated to the evaluation and the detailed description of the current condition of the bindings, accompanied by a detailed photographic documentation report.

The information gathered from the systematic recording of the features of the notarial bindings from the field surveys is gradually compiled in a database, specifically designed to respond to the aims and objectives of the project.

The literature review is expected to shed more light on key questions about notarial bindings. The study of the notarial practices using primary and secondary sources may clarify whether there were binding facilities in the places where the notarial ledgers were used, or they were bound in larger centres of production and traded among other stationery bindings to the places where they were used.

To support the research discussion over the materiality of the bindings, examination and analytical methods (optical microscopy, SEM/EDX, X-Ray microanalysis, FTIR etc.) are being applied to representative samples taken from certain parts of the bindings (leather, parchment, paper, thread etc.) and are expected to contribute to the identification and the assessment of the condition of the materials used for the structure of the recorded notarial ledgers.

On the other hand, the condition survey may serve as a useful tool for future conservation priorities, according to the levels of vulnerability of the volumes. The bindings requiring conservation treatments should be handled with respect to their historical typology and particular features.

Storage Solutions for a Sustainable Future

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ABSTRACT

In recent years, several low-energy storage facilities have been constructed across Scandinavia, employing innovative passive climate control strategies to reduce operational energy use and align with sustainability goals. This offers an alternative to traditional, energy-intensive ventilation systems. While these new approaches can greatly lower the carbon footprint during operation, the environmental cost of construction – particularly the embodied carbon in materials like concrete – can surpass the long-term savings achieved through reduced energy consumption.

Despite growing interest in sustainable museum practices, no life cycle assessment comparing Scandinavian museum storage facilities has yet been published. This research addresses that gap by comparing four newly constructed low-energy storage facilities with four retrofitted older buildings in Norway, Sweden, and Denmark. Through analysis of construction materials, operational energy use, and indoor climate performance, the study investigates how long a new low-energy facility must operate before its construction-related emissions are offset by its lower energy demands, and for how long a retrofitted solution remains a more viable, low-carbon footprint alternative.

The study also explores strategies to further reduce emissions during both construction and operation phases. One case study examines the use of wood as a structural material in place of concrete, assessing its potential to lower the carbon footprint while maintaining adequate preservation conditions and security. This case also provides valuable insight into the building's passive buffering capacity, as the HVAC system has been periodically turned off without compromising preservation conditions. Various operational strategies and settings are examined using real-world climate data, enabling a nuanced discussion of their impact on environmental performance and collection safety.

This three-year Ph.D. study started in January 2025 and is situated within the broader context of climate change, the Paris Agreement, and the UN Sustainable Development Goals (particularly SDG 11 and 12). It responds to calls from the conservation field for more sustainable practices in heritage preservation. By comparing quantified data from real-world examples, this study contributes to a more evidence-based approach to sustainable storage planning and offers guidance for museums, policymakers, and conservation professionals in the decision-making process of storage development or renewal.

Management, Policy and Practice: Conservator-Restorer's Profile in Portugal's Evolving Cultural Heritage Institutional Framework

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ABSTRACT

Portugal's approach to managing classified cultural heritage has transformed from a fragmented, overlapping network of institutions into a more integrated model shaped by political reform, societal change, and international standards. Once operating as decentralized branches of the General Directorate of Cultural Heritage (DGPC), regional bodies like the Northern Regional Directorate of Culture (DRCN) provided local policy implementation and technical oversight. The DRCN's dissolution, replaced by Cultural Heritage, I.P. and Museums and Monuments of Portugal, E.P.E., sought to simplify governance and unify the national framework for heritage management.

Within this new structure, the figure of the conservator-restorer as a supervisor of conservation-restoration interventions emerge as central to the effective implementation of heritage policies. This research uses the DRCN as a case study to explore how these professionals mediate between structural frameworks (laws, guidelines, and administrative hierarchies) and experiential realities that include the coordination of multidisciplinary teams, the preparation and evaluation of dossiers, and the supervision of onsite works. Acting as both technical specialists and managerial agents, conservator restorers embody the interface between policy design and practical execution within state institutions.

Decree Law n.º 90/2024 formalizes this position, defining qualifications, ethical obligations, and fields of responsibility. In aligning with European instruments such as the Faro Convention, the Heritage Strategy, and ECCO/ICOMOS guidelines, Portugal seeks to consolidate a clear professional profile that combines technical competence with administrative accountability. Yet, the centralization process also raises issues of limited autonomy, insufficient oversight, and resource constraints that directly affect supervisory capacity and project quality.

Comparative perspectives with Spain and other European frameworks reveal how differences in institutional decentralization influence the supervisory authority, autonomy, and professional recognition of conservator-restorers. Spain's regionalized system encourages innovation through localized governance, whereas Portugal's centralized model ensures consistency but risks bureaucratic rigidity and uneven enforcement.

Surveys and interviews with public-sector professionals highlight diverse educational and career pathways, challenges of precarious employment, and the ongoing need for continuous technical and managerial training. The evidence underscores that the supervisory role requires not only specialized conservation knowledge but also administrative literacy, legal awareness, and leadership skills to navigate overlapping competences within cultural heritage management.

By analyzing professional practices and institutional case studies, the thesis argues that defining and strengthening the supervisory profile of conservator-restorers is essential for a more efficient, ethical, and sustainable public heritage system. Only through clear professional frameworks, inter-institutional cooperation, and continued capacity building can Portugal ensure coherent stewardship and responsive governance of its cultural heritage.

Hacking as a Methodological Approach in Conservation

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ABSTRACT

The dissertation investigates hacking as a cultural practice and conceptualizes it as a form of digital craftsmanship with methodological potential for the conservation and restoration of cultural heritage. By critically re-examining the terminology of hacking and its distorted media portrayals, the study situates hacking within cultural, historical, and ethical contexts. It argues that hacking - understood not as criminal intrusion but as hands-on exploration, repair, and creative intervention - shares significant parallels with conservation-restoration practices, both of which operate through recursive cycles of disruption and creation.

Like hackers who metaphorically look behind closed doors, conservators-restorers also act as deconstructive and investigative agents whose work often takes place out of sight. They operate at the intersections of fragmentation and information loss, where knowledge is frequently encrypted, protected, or institutionally regulated. However, when knowledge is commodified and treated as an economic asset, restricted through licensing or secrecy, conservators may likewise find themselves in an oppositional position. In this context, the dissertation adopts a critical stance toward the promotion and support of proprietary, that is, unfree, information systems. Methodologically, the dissertation employs a transdisciplinary approach. It combines cultural-criminological readings (Steinmetz 2016), anthropological perspectives (Coleman 2013), and ethical frameworks (Levy 1984; Stallman 2012; Söderberg 2002, 2021) with conservation theories that emphasize a process-oriented perspective and the performativity of conservation.

The research addresses a central gap in existing research: while hacker communities have been widely studied in terms of subcultural identity, technical practices, and political activism, little attention has been paid to how their methods and ethical principles affect the preservation of cultural heritage. The analysis follows three guiding questions:

- How practices of repair, do-it-yourself, and hacking transform linear models of production and consumption into recursive, participatory processes of value creation, thereby redefining relationships between makers, users, and objects.
- How the division between tacit and explicit knowledge affects the actions and interactions between subject and object.

- What ethical and legal tensions arise when proprietary systems or copyright restrictions limit access to knowledge, thereby potentially endangering cultural heritage in the long term.

The resulting tension between individualism and collectivism touches upon fundamental questions of authorship, autonomy, and intellectual property.

Findings suggest that hacking can be reframed as a methodological resource for conservation-restoration. Practices such as reverse engineering, jailbreaking, and dynamic repair are not merely acts of subversion but strategies of resilience that preserve cultural information otherwise at risk of loss. By positioning conservators as participants in a “recursive public,” the dissertation redefines them not as neutral caretakers but as active cultural agents who continually reinterpret and reconfigure heritage in response to shifting social and technological conditions.

Ultimately, hacking as digital craftsmanship offers a new framework for cultural sustainability, one that expands the notion of heritage beyond material preservation to include practices, infrastructures, and digital ecologies. It calls for a rethinking of conservation as a dynamic, ethical, and participatory act of cultural resilience.

Reimagining 'Flor Negra': A Collaborative Artist-Conservator Approach Exploring Magnetic Systems

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ABSTRACT

This doctoral research examines the challenges posed by the conservation of contemporary artworks that rely on non-traditional materials and evolving artistic intent. It focuses on Flor Negra (1999), a large-scale painting by Portuguese artist Pedro Cabrita Reis, composed of industrial paint on aluminium. The artwork presents significant deterioration, particularly the detachment and loss of its pictorial layer, which has rendered it impossible to exhibit. These conditions have raised critical questions about how to conserve the visual and conceptual identity of an artwork when its material integrity can no longer be maintained.

The study seeks to understand how collaboration between artist and conservator can inform new decision-making models in conservation. An interview with Cabrita revealed his view that Flor Negra, in its current state, "no longer exists," and that a full re-execution should be undertaken. This decision reframes conservation as a collaborative act of recreation, rather than an attempt to restore the original object, and highlights the importance of dialogue in negotiating authenticity, authorship, and meaning within conservation practice.

The research integrates several methodological components: scientific analysis of the artwork's materials; interviews with the artist and stakeholders; the application of a structured decision-making model; and experimental testing of alternative conservation approaches. The deteriorated condition of Flor Negra revealed the inadequacy of traditional reattachment or consolidation methods, as these could compromise both the artist's intended surface quality and conceptual message. In response, the study proposes an experimental system based on magnetism, designed to be applied directly to the materials that will be used by the artist in the new version of Flor Negra. In this system, paint layers containing magnetic particles are held in position by magnets affixed to the reverse of the aluminium panels.

This magnetic approach aims to ensure the long-term stability of the pictorial layer through reversible, non-invasive, and preventive means. Prototypes are being developed to evaluate the mechanical performance, visual coherence, and durability of the system before its implementation. These prototypes will undergo a series of tests, including accelerated ageing and other stress evaluations, to demonstrate their safety and stability for potential application in the re-creation of the work.

The re-execution of Flor Negra by the artist himself functions as a case study to reflect on the broader implications of collaborative conservation in contemporary art. The process is being thoroughly documented, contributing both to an understanding of the artist's decision-making process and to the formulation of a methodological framework for similar cases in the future.

Ultimately, this research proposes a model in which the conservator acts as mediator and facilitator, emphasizing interdisciplinary collaboration and theoretical reflection. By prioritizing conceptual and aesthetic continuity over strict material preservation, it redefines conservation as an act of dialogue, creativity, and shared authorship - one that safeguards the essence of the artwork while respecting its evolving nature.

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