

# BOOK OF ABSTRACTS

**SHAKE**  
IN CONSERVATION

**CONSERVATION TALKS**  
BIG RESEARCH  
IN TINY SPEECHES

**11  
DECEMBER**  
MUSEUM LA BOVERIE, LIEGE

  
Liège

**LA BOVERIE**  
BEAUX-ARTS • EXPO • LIÈGE

# CONSERVATION TALKS

Big research in tiny speeches

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**December 11, 2018 | Museum La Boverie, Liège**

This event focuses on research in conservation led in Belgium. It aims to bring together heritage professionals & students for presentations and interactive sessions about recent research and theses. Conservation Talks is an opportunity for conservators to get in touch, exchange and enrich their research/practice; and for students and young graduates to make a first step into the professional world and get a constructive input about their research project.

Conservation Talks is organised by SHAKE in Conservation with the support of *La Boverie* and the *Echevinat de la Culture de la Ville de Liège* and the collaboration of the conservation departments of *École nationale supérieure des Arts visuels de La Cambre*, *École supérieure des Arts Saint-Luc Liège* and *Universiteit Antwerpen*.



# Programme

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**Estelle De Bruyn**      The sustainable storage and its perspectives for small-scale institutions (ENSAV La Cambre)

**Negin Eisazadeh**      Towards an inclusive approach to built heritage values (ULiège / KU Leuven-PhD)

**Annie Gilbert**      All-ceramic hybrids: identification, thoughts and choices (ENSAV La Cambre)

**Emilie Desbarax**      Atypical conservation: problematic of African paintings on flour sacks (ESA Saint-Luc)

11:30 // [Interactive discussion #1](#)

12:00 // [Lunch at Madame Boverie & behind-the-scenes guided tour by La Boverie](#)

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**Marianne Rochebeuf & Alexis Guillou**      Study and conservation of an ancient polychrome wooden Egyptian coffin (ENSAV La Cambre)

**Wivine Roland-Gosselin**      Comparative analysis of gap-filling materials applicable to painted enamels (ENSAV La Cambre)

**Laure Malherbe**      Use of 3D porcelain printing for the restoration of porcelain objects (ESA Saint-Luc)

**Océane Magnier**      Study of the adhesion of copper paintings, according to the procedures of the old treaties (ESA Saint-Luc)

**Najma Bras**      How to improve the internal and external transportation of works in *La Cambre* collection? Towards a loan policy? (ENSAV La Cambre)

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**14:05 // Session 3: Historical approach**

**Liesbeth Langouche** The use of clear window glass in Flanders in the 15th till the 19th century (UAntwerpen-PhD)

**Séverine Coibion** Study of the stability of Paraloid® B-72 used as varnish on oil paintings preserved in non-ideal conservation conditions (ESA Saint-Luc)

**Emmanuelle Nsunda** René Magritte, practitioner: archaeometrical study of two artworks *La forêt* and *Le mariage de minuit* (ULiège)

**14:40 // Interactive discussion #2**

**15:10 // Break & Poster Session**

**Isabel Osselaere** Material technical study of European lacquer on two natural horns of Courtois Frère 1803-1845 in Paris. (UAntwerpen)

**15:40 // Session 4: Technical solutions**

**Sophie Hawotte** Additive manufacturing technologies for heritage preservation and transmission. 3D printing available for the conservator (ENSAV La Cambre)

**Isabelle Cuoco** A reversible alternative for the gap-filling on glass fibre reinforced polyester artefacts: a case study (ESA Saint-Luc)

**Laura Guilluy** The mechanical behaviour of new synthetic adhesives for the re-joining of panel paintings, a comparative study of Paraloid® B-72, Paraloid® B-44, Paraloid® B-48 and their mixtures (ENSAV La Cambre)

**Clémence Jacqmin** Retouching unvarnished acrylic emulsion paintings: a comparative study of suitable retouching materials (ENSAV La Cambre)

**16:30 // Caitlin Southwick | SiC - Sustainability in Conservation**

**16:45 // Interactive discussion #3**

**17:15 // End**

**18:00 // Drink**

# Abstracts

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**CONSERVATION TALKS | Big research in tiny speeches**

**December 11, 2018, | Museum La Boverie, Liège**



### Session 1: Ethical reflection

## The sustainable storage and its perspectives for small-scale institutions: An online guide for improving museum storage

**Estelle De Bruyn** (ENSAV La Cambre)

Estelle De Bruyn completed her master at ENSAV La Cambre in paper conservation. She specialised in preservation through internships at CCI and at ICCROM. Estelle's dissertation explored sustainable storage solutions targeting small-scale institutions. She works at KIK-IRPA in the preservation unit. She is the SAP project coordinator at Sustainability in Conservation.

Could the characteristics of small-scale institutions (SSIs) – the necessity of social innovation, the need for cost-effective solutions – help us designing sustainable practices in the preservation field? We compared recent methods for enhancing preservation conditions. Some promote preventive conservation practises (eg: RE-ORG, ICCROM & CCI, 2017), others advocate a transition towards sustainability (eg: The Green Museum, Sarah Brophy, 2008). The methods were selected for their recentness, low price, the existence of case studies and their applicability in the SSIs context. Our aim was to help SSIs professionals to assess their problems of storage in a sustainable way. We created Sustainable storage, a collaborative website, to share our analysis (see:<https://sustainablestorage.miraheze.org/>).

Cornerstone of the museum's mission, the storage is a place where preservation requirements justify high financial costs and energy consumption. A study led by the Image Permanence Institute (IPI) in 2012, shows that the HVAC system consumption costs by itself from 22 to 55 USD per m<sup>2</sup> per year. At the same time, cultural institutions worldwide are missing financial, human and time-related resources. SSIs situations are usually even worse according to Gaël de Guichen, expert at ICCROM for 48 years. Furthermore, coming EU laws will leave no choice to cultural institutions but to invest in nearly-zero-energy buildings (NZEB) for building or renovating their facilities. Even though several tools for implementing green practices are available, and despite the advantages that “Going green” could offer them, sustainability is often at the bottom of the SSIs priority list.

Thanks to a survey addressed to Belgian SSIs, we defined their characteristics and needs in terms of conservation practises. That led to the creation of Sustainable storage, which compares the above methods in light of the survey results. We propose a reflexive model of SSIs management combining “Going green” and state-of-the-art preservation methods such as RE-ORG.

## Session 1: Ethical reflection

# Towards an inclusive approach to built heritage values

**Negin Eisazadeh** (ULiège / KU Leuven-PhD)

Negin Eisazadeh is an engineer-architect (University of Tehran) and architectural historian (University of Shahid Beheshti) and has an advanced master in conservation of monuments and sites (RLICC, KU Leuven) and digital humanities (KU Leuven). She is currently conducting her PhD research titled *An Inclusive Approach to Built Heritage Values* as a collaboration between ULiège and KU Leuven.

In creating and modifying the built environment, an inclusive design approach, which seeks resonance between the requirements of people with special needs and those of the general public and strives to treat everyone in an equitable way, is turning into a necessity for today's diverse and ageing society. This interdisciplinary research investigates an inclusive approach in conservation of historic architecture and urban environment. The main objective is taking fundamental steps in making built heritage inclusive, i.e. reachable, accessible, understandable and usable for the broadest possible group of users. Through collaboration with disabled people and acknowledging the expertise-by-experience of these user/experts, this research studies their interaction and engagement with built heritage and aims to improve their relation with heritage and its values. Moreover, the insights gained will allow to further enhance built heritage's perception and relation with society at large. The knowledge acquired in this research in collaboration with the user/experts and professional experts will allow to inform the decisions of policy makers and the main actors in the built heritage field for protecting and presenting heritage values and furthermore, develop theoretical and practical guidelines that address the existing issues in an inclusive approach in conservation of built heritage.

## Session 1: Ethical reflection

# All-ceramic hybrids: Identification, thoughts and choices

**Annie Gilbert** (ENSAV La Cambre)

Annie Gilbert was born in Quebec where she obtained a bachelor's degree in visual arts at Laval University. Then, she moved to Belgium and completed a master in ceramic and glass conservation at ENSAV La Cambre (2016-2017). Nowadays, she does contractual work at the Conservation Center of Quebec.

What is exactly an all-ceramic hybrid?

That question you probably got in mind says a lot regarding the vocabulary issues in conservation on that matter. In fact, the master thesis I wrote about these objects tends to establish a terminology to ease the debates on the subject. The main goal was to give the professional community an awareness of the possibilities and stakes to consider during the decision-making process for the conservation of each all-ceramic hybrids.

To identify the problem, I looked through an inventory of different case studies and got the help of specialists from various cultural horizons. I used (and adapted for the field of ceramic conservation) the definition given by the conservator Juanita Navarro, whose recent research concerns all-glass hybrids.

According to the collected data, an all-ceramic hybrid can be described as:

A ceramic modified or repaired with at least one ceramic piece coming from different origin(s). The substitution fragments can come from one or many other original objects (*rapaillés* fragments) or have been fabricated (reproduced fragments) to complete a specific ceramic.

All-hybrid objects are nowadays an important concern for conservators because we often encounter these types of objects in all art fields (sculpture, painting, glass, etc.). Indeed, a considerable amount of them were stitched together around the end of the nineteenth century. At that time, we displayed collections of 'beautiful fully preserved' objects that could represent the glory of the past civilisations. To fulfill the aesthetic expectations of the public, the alterations of the artefacts were hidden under thick layers of mastics and paint. These restoration materials aged badly. As a result, many 'undercover' hybrids were identified over the years and systematically dismantled, because we considered them as frauds...

But is it that simple?

Maybe, the will of making disappear all-ceramic hybrids shows a lack of acceptance and documentation about the choices restorers made in the past?

Changes of mentalities give today new ethical perspectives. Recently, we can observe among the conservation community a real growing interest in ancient restoration techniques. Among them, all-ceramic hybrids give us a perfect opportunity to embrace our conservation history with humility: a reminder that the work we do now will probably be criticised in the future.

Studying them, we can discover new historical contexts, obtain information about old restoration material, notice their often fragile current state... All-ceramic hybrids can be seen as valuable assets and testimonies of specific cultural manifestations. Their value should be 'restore' and their story, our story, be told.

## Session 1: Ethical reflection

# Atypical conservation: problematic of African paintings on flour sacks

**Emilie Desbarax** (ESA Saint-Luc)

Emilie Desbarax studied conservation of paintings at ESA Saint-Luc Liège: a five-year program, including a bachelor and a master. Now, she works for Altritempi: a company who restores monuments and sites.

A few years ago, I faced some conservation issues while taking care of an African painting collection at the Royal Museum for Central Africa in Tervuren. This collection includes 2000 paintings, dating from the 1960s up to the present day. They all come from the Democratic Republic of Congo and probably represent the largest collection of its kind in the world. Their iconography is related to historical and moral subjects as well as to the daily life of the Congolese people. The paintings have different kinds of supports made from local materials: flour sacks, worn fabrics like jeans, t-shirts and curtains. These recycled supports contains many important historic information; such as dates, inscriptions concerning the acquirement, company names of the flour sacks.

The fragile nature of the supports, frequent transports and inadequate handling of the paintings have caused various damage. Also, the artists painted outside or in dirty environments, used recycled materials and didn't apply any preparation layer. They mainly used their own mixture made with household paint in which they could have added palm oil or manioc flour. Therefore, it explains the damages, flaking and losses observed on the paintings of the museum's collection.

The fact that we needed to keep the inscriptions on the backs visible, led to research focused on transparent linings. The aim was to find an ideal and affordable lining showing the necessary properties: stability and reversibility of the adhesive, transparence after drying, ease of application such as Plextol® B500 and BEVA® 371 film. The lining had to be compatible with the materials employed in the paintings; so we were looking for a transparent, reversible, resistant, elastic and inert product like Petex® and / or Nitex®.

Samples were made to look like the original supports: cotton canvas with similar information written on the back. One of the issues was to find a technique which didn't smudge the ink. Natural adhesives and traditional canvases were eliminated due to their yellowing, and for their non-transparency. The results of the tests (including accelerated ageing and peeling) showed that Petex® was the most suitable and that Beva® 371 film showed the required properties. One painting from the collection, *Mami Wata*, a really mythic representation, was treated following these conclusions.

We are not used to being confronted with such atypical cases. This research allowed me to question my views on traditional conservation and restoration. It also underlined the importance of the painting materials and care in their handling for their future conservation.

Session 2: Work-in-progress

## Study and conservation of an ancient polychrome wooden Egyptian coffin

**Marianne Rochebeuf & Alexis Guillou** (ENSAV La Cambre)

After two years spent in a fine art school, Alexis Guillou studied for five years at the *École Supérieure de Condé* in Paris where he acquired a first master's degree in conservation of paintings. He worked for three years as a professional before he entered ENSAV La Cambre. The aim was to specialise in the conservation of panel paintings.

After intending four years of law school, Marianne Rochebeuf entered the restoration section at ENSAV La Cambre in 2014 where she specialised in conservation of sculptures. Studies and structural treatments of stones are what interest her the most.

The topic of this project was the structural conservation of an ancient Egyptian polychrome wooden coffin. This object arrived at the school studio as several dismantled parts. The coffin was covered with dirt and no apparent decoration were visible.

In order to understand more about the structural dilemma and to make the most adequate treatment proposition, we studied the wood used and the original technic of construction of the object. First, we stated a detailed condition report. Then, C14 analysis and observations on thin sections were made. The information we gathered during the research allowed us to locate the weakest parts of the structure and to define the methodology for giving the object its 3D cohesion back.

As this was an archaeological object, we had to deal with a specific conservation deontology: how to perform the most minimalist intervention while guaranteeing the reinforcement of the whole construction.

Regarding the materials for conservation, we tested adhesives for wood consolidation and different ways to replace or restore missing or broken wooden pegs.

This project shows how a multidisciplinary approach is essential to achieve the most suitable conservation treatment.

Session 2: Work-in-progress

## Comparative analysis of gap-filling materials applicable to painted enamels

**Wivine Roland-Gosselin** (ENSAV La Cambre)

Wivine Roland-Gosselin is a master's student from ENSAV La Cambre, specialised in ceramic and glass conservation. Showing much interest for composite objects, her master's thesis brings metal and glass together and promotes a transdisciplinary approach.

Painted enamels are part of the most damaged objects composed of glass in museums. The metallic support can suffer from chemical and mechanical degradations. The enamelled surface is sometimes altered chemically, but most often mechanically. These mechanical alterations can be linked to the physical structure of the enamel, to its adherence to the support, to bad manipulations, or to former inadequate restorations/repairs. They lead to cracks and losses of the enamel.

The filling of these losses is necessary and has a triple role: it stabilises mechanically the enamelled surface; it isolates the metal support and prevents it from chemically reacting and it contributes to a better reading of the object and to its aesthetical aspect.

There is a large range of materials used for gap-filling of enamels, and restorers have been choosing subjectively what seems to work. As for now, no objective study guarantees the compatibility of these materials with the chemical reactivity of the metal and the physical fragility of the enamel.

In order to proof check the currently used materials and to find more suitable techniques, the methodology of the present study is to evaluate and compare the optical, physicochemical and implementation characteristics of each of these materials.

Session 2: Work-in-progress

## Use of 3D porcelain printing for the restoration of porcelain objects

**Laure Malherbe** (ESA Saint-Luc)

Laure Malherbe is a second-year master's student at ESA Saint-Luc Liège, in conservation of ceramic and glass. She is passionate about technological advances in art restoration.

This thesis does not focus on a concrete case in restoration but it rather expresses the desire to discover and adapt new materials for the conservation of works of art. Some research has been led concerning the use of 3D printing elements in conservation, although the 3D porcelain material has not been studied yet. The purpose of my thesis is to know as much as possible about the characteristics of the 3D porcelain material, designed by David Huson, PhD (UK) to determine its real interest in restoration. The characteristics will be evaluated using various scientific analyses, such as: X-ray fluorescence, spectrophotometry, light-accelerated ageing—and also other methods to determine the granulometry, density and porosity of the material. The second part of my project will focus on the restoration of a Meissen porcelain spice cabinet that lacks small elements, which will be reconstituted using 3D technologies and then printed in 3D porcelain (David Huson, PhD). The result should determine if the aesthetic aspect of the material is convincing enough for this type of object.

Session 2: Work-in-progress

## Study of the adhesion of copper paintings, according to the procedures of the old treaties

**Océane Magnier** (ESA Saint-Luc)

Océane Magnier is a French student at ESA Saint-Luc, in Liege. She is currently in the second year of her master's degree in conservation-restoration of art, specialised in easel paintings.

The most common degradation of oil paintings on copper is adhesion failure of the paint layer. The physicochemical phenomena, playing a role in the adhesion of copper paintings, are not well understood. The manufacture of the materials as well as the painting technique are most probably decisive factors in the occurrence of flaking.

A good adhesion of the different layers depends on the cohesion of the materials, and, more particularly, on the adhesion forces at the interface between the support and the upper layers. Because of the composite nature of a copper painting (organic, inorganic), an interphase with its own properties is formed. Its properties depend on the chemical nature and characteristics of the surfaces in contact.

The main purpose of my thesis is to characterise this interphase. Tests such as the three-point flexure test and the pull-off test will be carried out on prior prepared samples to measure the practical adhesion: i.e. the fracture energy when the paint layer is delaminated. The interest is to evaluate which combinations of factors are responsible for the loss of adhesion.

## Session 2: Work-in-progress

# The conservation of works of art in movement: how to improve the internal and external transportation of works in La Cambre collection? Towards a loan policy?

**Najma Bras** (ENSAV La Cambre)

Najma Bras is completing her master's degree in conservation and restoration of art, specialised in paintings, at ENSAV La Cambre. Previously, she obtained a bachelor in art history at the *Université Libre de Bruxelles* (ULB).

In 2009, Karlien De Voecht wrote a thesis about the creation of a management policy for the collection of La Cambre—this is how we discovered a collection build on former students and teachers' works. For the past ten years, La Cambre's conservation and restoration department has kept its management by carrying out each year a preventive conservation module that ensures the inventory, the packaging and the storage of the artworks.

There are three interrelated elements in a collection policy: the recording of collections, the preservation of collections and the control of access to collections through the exhibition. In addition, the main mission of a school is to teach. Preserving and showcasing its art collection is one of its goals. Therefore, the collection is increasingly confronted with a new challenge: exhibition.

This research aims to continue the existing work and to improve it, implementing procedures of handling, moving, exhibiting and loaning. It belongs to the domain of collection management. The first step will be to define the role and missions of a registrar in a collection. The second step of the research will be to evaluate and highlight the flow issues to fit the collection's needs.

The work will conclude with the adaptation of specific procedures to La Cambre's collection.

### Session 3: Historical approach

## The use of clear window glass in Flanders in the 15th till the 19th century

**Liesbeth Langouche** (UAntwerpen-PhD)

After studying art history and conservation-restoration, Liesbeth Langouche was successively active as a restorer of stained glass and as a journalist for an art magazine. In 2016 she worked at the University of Antwerp on a project about historical clear window glass, that is now being continued in a PhD.

With this study I want to research what sorts of window glass were used in the 15th till the 19th century in the historical region that covers the nowadays Flanders.

Contrary to the utilitarian glass or the decorative stained glass, historical clear window glass rarely gets attention. Moreover, its fragility and 'invisibility' - as we literally look through it - are reasons why this part of the built heritage gradually gets lost. And should window glass have survived several centuries, it often gets replaced by insulation glass. Even when the restorer takes into account the historical sight of the building, the new 'antique looking' glass is not always chosen carefully.

Previous research already showed that the historical use of window glass is a story of quality, prestige, comfort and cost consciousness. In other words: in the past people had the choice between several sorts of window glass, as such that their choice was determined by several parameters. By investigating this, I want to gain insight in the valuation and the use of clear window glass in the past. Furthermore, my study wants to provide a guideline for the restoration and reintroduction of historical correct window glass in monuments.

### Session 3: Historical approach

## Study of the stability of Paraloid® B-72 used as varnish on oil paintings preserved in non-ideal conservation conditions

**Séverine Coibion** (ESA Saint-Luc)

Severine completed an artworks conservation-restoration master at ESA Saint-Luc Liège in September 2018. During these studies she chose the option easel paintings. Last May, she had the opportunity to present her thesis research as a poster at the conference organised by Encore in Turin.

Paraloid® B-72 is a binary copolymer composed of ethyl methacrylate and methyl acrylate in a proportion of 70:30 which is frequently used as a varnish for oil paintings. Its stability has been investigated since the 1970s, and the results are widely published. They indicate that Paraloid® B-72 is rather stable when used as a varnish in a controlled museum environment. However, many paintings varnished with Paraloid® B-72 are not conserved in museums. This study focuses on the stability of Paraloid® B-72 used as varnish under non-ideal conservation conditions.

Restoration files from the Royal Institute of Artistic Heritage (KIK-IRPA, Brussels) archives, from 1950 to 2000, were investigated in order to find oil paintings varnished with at least one layer of Paraloid® B-72. The paintings had to be in Belgium and not be part of a private collection. On the 1664 files consulted, 71 met the search criteria. Their analysis revealed how Paraloid® B-72 is used: type of system (alone or superposed on damar resin, Keton N® resin or various retouching varnishes), solvent, percentage, number of coats and application method.

Following this research at the KIK-IRPA, a panel of twenty-eight paintings was selected taking into account the systems encountered as well as the accessibility of the paintings: five conserved in a museum and twenty-three in places such as churches, convents, schools, etc. Each painting was observed in order to see if alterations of the varnish were visible. A resin sample was taken through a local varnish removal using solvents through Japanese paper. The Japanese paper containing the resin has then been analysed with a Nicolet 380 Fourier transform infrared spectroscopy to evaluate the chemical stability of the varnish. Changes in colour of the varnish have been assessed using a Konica Minolta CM-700d spectrophotometer by evaluating the difference between the colour of the paint surface before and after varnish removal.

The results of each operation were analysed and conclusions were drawn. No obvious differences were observed between the paintings conserved in museums and those conserved in other places. This indicates that for the aspects studied, Paraloid® B-72 is as stable in places with ideal conservation conditions as in other places encountered.

### Session 3: Historical approach

## René Magritte, practitioner: archaeometrical study of two artworks *La forêt* and *Le mariage de minuit*

**Emmanuelle Nsunda** (ULiège)

Emmanuelle Nsunda studied conservation of paintings in ESA Saint-Luc Liège. After her master's degree, she majored in Archaeometry at the ULiège. She then participated in the inter-university certificate in intangible cultural heritage. Today, she works part-time on a cultural project in Liege and another half as freelance paintings conservator.

René Magritte left us a considerable artwork. Over the years his work has been studied from different perspectives, but the study of materials has been underestimated. In 2015, I proposed the archaeometry department of the ULG to study his works.

At the border between human and exact sciences, this discipline questions the matter shaped by the man in a strictly objective way. This approach seemed to me essential for several reasons: better know the habits and skills of the artist, in order to use the best tools for proposing the most appropriate conservation conditions and to get a good understanding of the ageing of the works. In addition, the reputation of Magritte increases risks of fake production. The analytical methods used in archaeometry allow knowing in depth the work of the painter and confirm the expertise of art historians.

Through the study of two early works of the artist: *The Forest* (1926) and *The Marriage of Midnight* (1926) we proposed a definition of the pictorial technique of the surrealist painter. To do this, we opted for a combination of imaging techniques and non-invasive in situ analyses (XRF and Raman), to mitigate the works stress. The funnel structure approach used for the tests allowed the extraction of precise technical information, in view of literary and iconographic sources, and of previous and subsequent examination and analyses. Thus, starting from a comprehensive list of Magritte's works, we have gradually targeted our first focus on oil paintings and then on their constituent materials. This way, we were able to extract Magritte's favourite materials and develop a typical pallet for the period 1925-1935 which, compared to previous analyses, can be qualified as reliable.

During our communication, we will talk about the results of these analyses by presenting the pigments of predilection selected by the painter and disclosing the so little-known protocol of creation of Magritte our work made possible to reveal. We will also assess the strengths and weaknesses of this methodology and the research that emerged from it which are still in process right now.

#### Session 4: Technical solutions

## Additive manufacturing technologies for heritage preservation and transmission. 3D printing available for the conservator

**Sophie Hawotte** (ENSAV La Cambre)

Sophie Hawotte obtained her master's degree in conservation of ceramic and glass from ENSAV La Cambre in 2014. She manages the Fab Lab of ENSAV La Cambre since September 2014. In 2018, Sophie created the 3D Conservation project to offer a set of services combining the conservation of artworks with the digital manufacturing tools.

The purpose of this master thesis is to convince conservators that 3D printing can support our discipline. This short talk explains how the 3D technologies have been employed to support the conservation research.

The work begins with an expanded description of the main 3D scanning and 3D printing systems. This opening is necessary for beginners to understand and to view the range of the news possibilities.

The example of conservation treatments achieve with 3D printing is so restricted. I do not want to limit the research to a single type of material. A selection of examples collected in the literature shows that 3D scanning and 3D printing are a real advance for conservation.

I wanted the conservator to be fully involved in the process. So it is very important for me to participate in the entire process of digitalisation and printing. I did a one-year internship at Sirris Center to learn to scan, drawn, design and use the machines.

The examples of reconstructions (shape and structure) with 3D printing are uncommon. So I chose to continue my research in this direction. The first tests were made with common objects. The interesting findings were then applied to artworks. The research was then conducted towards problems not solved by conservation.

Today, many examples demonstrate that 3D technologies offer a wide range of possibilities. The restoration treatment is more than a physical and direct intervention on an object. It also concerns analysis, documentation, packaging, exhibition, reproduction, etc.

The new challenges of this research is to combine the conservation and the digital manufacturing. In order to achieve that project, I'm using my experience with the Fab Lab's tools. Therefore, the current research is no longer limited to 3D printers but concern all of computer-driven machine tools (3D scanners, 3D printers, laser cutters, CNC milling machines,...).

The project named 3D Conservation offers a set of tailor-made services for individuals, professionals and people in charge of the safeguarding and transmission of cultural heritage. From the digitisation of the object, those services are settled from simple archiving, virtual and real conservation, to the development of structural reinforcements, passing through realisation of pedestals, boxes for conservation and transport.

The added value of the project is that all the interventions, whether digital or classical, are all done by one person, avoiding miscommunication. Combining my conservation practice and the management of the Fab Lab, I ensure that the rules of ethics of our discipline are respected.

#### Session 4: Technical solutions

## A reversible alternative for the gap-filling on glass fibre reinforced polyester artefacts: a case study

**Isabelle Cuoco** (ESA Saint-Luc)

Isabelle Cuoco is a young plastics conservator who continues her specialisation at the *Institut National du Patrimoine* (Paris). She attended internships in several institutions and conservation studios: CICRP of Marseille, Aurélie Compère (plastic conservator) and the Air and Space Museum of Le Bourget where she dealt with the identification of plastics used for the famous Concorde.

Currently, glass fibre reinforced polyester (GRP) artefacts have an important place in museum collections. Publications concerning conservation treatments applied to GRP are rare and frequently offer the same type of intervention regarding loss compensation. The goal of this study is to suggest a reversible gap-filling method that respects the original stratigraphy of the GRP work of art. With this aim, three resins frequently used in conservation were compared according to several criteria. The chemical stability of the resins was tested. Then, they were coloured and applied onto GRP sacrificial samples created for this purpose. This study aims to suggest a gap-filling method that can be applied to any other GRP work of art preserved indoors. This study and the conservation of a GRP piece belonging to the Art & Design Atomium Museum of Brussels highlight both theoretical and practical approaches. The piece chosen was the *Présentoir à vêtements* (clothing display), which was designed by Valéric Doubroucinskis and produced by Intexal for the French brand Rodier in 1972.

#### Session 4: Technical solutions

## The mechanical behaviour of new synthetic adhesives for the re-joining of panel paintings, a comparative study of Paraloid® B-72, Paraloid® B-44, Paraloid® B-48 and their mixtures

**Laura Guilluy** (ENSAV La Cambre)

Laura Guilluy is a conservator of paintings. She graduated from ENSAV La Cambre in Bruxelles in 2017. After her studies she did an internship at the Art Gallery of New South Wales in Sydney, Australia. She is now doing a fellowship at the Royal Institute for Cultural Heritage in Brussels, Belgium.

Treatment of panel paintings can include the rejoining of planks or the gluing of cracks. The choice of the adhesive is decisive for a precise gluing and an optimal conservation of the painting over time. However, few adhesives are available and have been tested for the re-joining of panel paintings. In northern countries of Europe fish glue and PVAc are the only two adhesives that are used for rejoining panel paintings. The lack of options for the restorer can be a barrier.

In order to expand materials used for the re-joining of panel paintings, mechanical behaviour of new synthetic adhesives was studied. There are a lot of parameters that the adhesive must combine to assure the good conservation of the artefact. The most important criteria I followed when choosing new adhesives were glass transition temperature above 30°C, good stability and reversibility. I have decided to focus this research on synthetic resins that can be dissolved over time with organic solvents. Therefore, three synthetic adhesives have been selected: Paraloid® B-72, B-44, B-48 which have been tested in the field of conservation of ceramics and sculpture. However, they have never been tested for the re-joining of panel paintings. We were therefore facing a lack of information about their mechanical behaviour when applied to wood. The main question of this research was then to find out if they would make joints resistant enough.

In this perspective, this study examines the response of eastern quarter sawn oak samples joined with Paraloid® B-72, B-44, B-48 and their mixtures in specific proportions (25/75, 50/50, 75/25) concentrations (30, 40, 50 %) and solvents (acetone and ethyl acetate) to bending forces. Bending tests have been done in collaboration with the Engineering Department of the University of Louvain-La-Neuve. During bending tests, the maximal load to restraints (force per unit area) has been measured. Those results for samples glued with different Paraloid® were compared to those glued with commonly used adhesives such as fish glue and PVAc. Results demonstrated that few Paraloid® (Paraloid® B-72 and B-44 (50/50) at 40 and 50 % in acetone) have as much strength to bending as PVAc or fish glue. We may add that the strength of the joint depends on the Paraloid®, the concentration and the solvent used. Moreover, the use of Paraloid® for the re-joining of panel paintings may favour a further dissolution with organic solvents that will not produce swelling of wood. This is indispensable for the good conservation of damaged wood including those that have been subjected to woodworm attacks. Paraloid® products are also well known for their very good stability over time. Furthermore, experiments of gluing panel painting prototypes in real condition showed that the complicated action of rejoining with Paraloid® is also achievable.

#### Session 4: Technical solutions

## Retouching unvarnished acrylic emulsion paintings: a comparative study of suitable retouching materials

**Clémence Jacqmin** (ENSAV La Cambre)

After studying art history at the Sorbonne, Clémence Jacqmin obtained her master's degree in painting conservation in 2018 at the ENSAV La Cambre, with a thesis focused on the scientific and empirical evaluation of suitable retouching materials for acrylic paintings. She now works as an independent conservator in France and Belgium.

During the 1960s, acrylic paintings gained popularity among the artists, and this media allowed them to create easily and quickly large paintings, monochrome paintings or very thinned aspects of the pictorial layer... effects that were rare with oil painting. Also, depending on the desired effect, the aspect of the paint layer can be matt or glossy (depending on the use by the artist, and the composition of the paint itself, such as pigments or additives).

Despite these aesthetic benefits that the acrylic paint provides, acrylic films have many flaws such as sensibility to polar organic solvents (and to some extent water) and are prone to accidental pictorial alterations (more than oil because acrylic remains flexible and "soft" after drying). Most of the needed retouching caused by accidental alterations of the paint layer is directly on the film (and not on a lacuna, or filling, as this type of alterations is rare on acrylic paintings) so the notion of reversibility is crucial. This is why this study is focused on retouching media that are suitable for acrylic paintings.

Those materials suitable for acrylic paintings are then soluble in either water or aliphatic hydrocarbons. The tested materials are Aquazol® 200 and 500, Klucel® G, arabic gum, and Regalrez® 1094 mixed with pigments. Ready to use materials (Aquacryl®, QoR®, and Winsor & Newton® watercolours) were also tested to see if they could be useful for the conservator (and mostly gain time).

Various criteria were evaluated during the two phases of tests: first, all the materials were tested mixed with titanium white and their gloss and colour were measured, to see which material is more prone to produce matter films. A set of samples were then exposed to artificial light ageing, and another set exposed to high relative humidity in order to isolate the impact of light and humidity on the gloss and colour of the resins (like yellowing), and how the retouching could behave in poor conservation conditions.

The second phase was more empirical: the resins were mixed with five different pigments to see the difference of coverage and saturation between materials. Most importantly, the materials were tested on naturally aged acrylic paintings by a panel of students, to see which material(s) they would like to use, recommend, or use themselves.

The aim of this study wasn't to find the right retouching material, but rather to enlarge the possibilities for the retouching of acrylic painting.

## SiC—Sustainability in Conservation

### Caitlin Southwick

Caitlin Southwick is a stone conservator at the University of Amsterdam with a keen interest in sustainability. She is a professional member of the AIC Sustainability Committee and the secretary for the ICOM Working Group on Sustainability. She founded Sustainability in Conservation (SiC) to build awareness and promote sustainable practices.

Sustainability can feel like an abstract concept when it comes to conservation. However, preservation of our cultural heritage inherently includes the preservation of our planet and humanity. While the majority of conservators consider sustainability important, it seems difficult to understand how to bridge the gap and actually incorporate it into practice. Until recently, sustainability has remained an intangible notion.

Sustainability in Conservation (SiC) is an international organisation aimed at promoting more sustainable practices in conservation of cultural heritage and related fields. SiC offers reliable resources and programs to make implementing sustainability feasible. SiC's vast international network provides a platform to connect professionals, students, researchers and teachers from around the world to promote collaboration and cooperation on a global scale. SiC has over 3.000 members across various social media platforms and an online forum for asking questions and sharing ideas regarding sustainability.

SiC offers programs to facilitate the transition to more sustainable practices, such as the Sustainability Tool Kit, developed by former UNESCO consultant Sarah Braun and based on the UNESCO Sustainable Tourism Tool Kit. The SiC Sustainability Tool Kit provides inspiration from case studies around the world to demonstrate best practice and showcase tangible actions to implement more sustainable solutions. The Student Ambassador Program (SAP), currently in its second year at 10 universities around the world, empowers students to further environmental responsibility during their education. SAP, coordinated by Estelle De Bruyn (ENSAV La Cambre) and Julia Wagner (The University of Amsterdam), enables students to take the transition to sustainable practice into their own hands and with the aid of a step-by-step handbook to identify problem areas in their labs and implement simple solutions. By incorporating this way of thinking at the training level, sustainability will naturally become a part of everyday practice.

It is well established how important it is to change the way we think and the way we act in order to try and overcome climate change and the challenges of today's society. In order to meet values of various sustainability goals (i.e. the SDG's and the *Paris Agreement*) it is vital that everyone, in every profession, contributes. We can begin by reassessing how we practise conservation, and by being aware of the impact we make, in order to find solutions to minimise the negative impact of our field and become leaders in the change toward a sustainable future.

## Poster Session

# Material technical study of European lacquer on two natural horns of Courtois Frère 1803-1845 in Paris.

**Isabel Osselaere** (UAntwerpen)

Isabel Osselaere studied conservation-restoration at the University of Antwerp. Throughout her bachelor's degree, she focused on the conservation of metal and wood. Her master's thesis combined her passion for French horns and polychromed natural horns. Isabel is currently working at Metafose in Antwerp and continues her research on polychrome horns.

On this poster, we present a master's thesis that encompasses the study of two polychromed natural horns produced by Courtois Frère in Paris, between 1803-1845. At first glance, the original decoration on both horn bells is strikingly similar, thus raising the question whether the horn bells were decorated by one lacquer workshop or artisan.

A comparative study of the designs, tool marks, and techniques was executed by the University of Antwerp and the *Hochschule der Künste* in Bern. Layers were studied microscopically, and by means of organic and inorganic analyses with XRF, FTIR-FPA, and SEM-EDS.[1] The analytical results were contextualised using (historical) art technical literature.

Convincing similarities between both designs were observed and the lacquers' composition on both horns is similar: a drying oil, mastic, and (possibly) copal. However, technical differences regarding the layers' buildup and the red lacquer were observed. Yet, we suspect both horns were decorated by one workshop or artisan, indicating a certain type of partnership. The minor technological differences might be explained from an economic perspective, reflect the artistic freedom or an evolution in practice of the artisan or a particular workshop.

[1] With the kind aid of the Stefan Zumbühl Hochschule der Künste Bern.

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