

Semi-synthetic and Synthetic Textile Materials in Fashion, Design and Art

ICOM-CC Modern Materials and Contemporary Art
& Textiles Working Groups Virtual Joint Interim Meeting

21-23 February 2023

Joint Interim Meeting Programme

WELCOME

Welcome to our joint interim meeting on **Semi-synthetic and Synthetic Textile Materials in Fashion, Design and Art!** The event is organised by the ICOM-CC Modern Materials and Contemporary Art & Textiles Working Groups.

Collections from the 20th century, especially those that focus on fashion, design and art, have semi-synthetic and synthetic textile materials. Since their development in the late 19th century, innovations have continuously developed throughout today. The degradation, preservation and conservation of these materials are in need of constant research, as many behave and degrade in unknown ways when compared to natural textiles and to synthetics used in three-dimensional objects.

This meeting brings together two conservation disciplines, Textiles and Modern Materials & Contemporary Art, to merge knowledge and increase awareness on the technology, identification, degradation and conservation of semi-synthetic and synthetic textile materials. The conference includes keynote speakers, paper and poster presentations, a panel discussion, a speed exchange session, lab tours and much more! International contributions come from conservators, conservation scientists, curators, scholars, artists, textile manufacturers, students, emerging professionals and all who participate in the live Q&A and sessions!

The event will be held online on the ICOM-CC Zoom Platform and is open to members and non-members. The Zoom link will be provided to registered participants the day before the event.

For registration please use the following link: <https://forms.gle/M8r1XrCsamTp7gnd8>

JOINT INTERIM MEETING ORGANISERS

Anna Laganà & Sarah Benson,
ICOM-CC Coordinators of the Modern Materials and Contemporary Art & Textile Working Groups

JOINT INTERIM MEETING COMMITTEE

Sarah Benson, ICOM-CC Textiles Working Group Coordinator
Anna Laganà, ICOM-CC Modern Materials and Contemporary Art Working Group Coordinator
Bronwyn Cosgrove, Assistant Coordinator: ICOM-CC Textiles Working Group Coordinator
Julia Langenbacher, Assistant Coordinator: ICOM-CC Modern Materials and Contemporary Art Working Group
Kendra Roth, Assistant Coordinator: ICOM-CC Modern Materials and Contemporary Art Working Group
Sarah Scaturro, Assistant Coordinator: ICOM-CC Textiles Working Group Coordinator
All sessions are moderated by the committee.

EDITORS

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LAYOUT

Julia Langenbacher
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COVER IMAGE

H&M Innovation Circular Design Story “Oversized Faux Fur Coat (recycled polyester) and Sequined Trousers (recycled PET bottles for sequins without a metallic finish and recycled polyester textile)”.
Photo: Sarah J. Benson / Nationalmuseum, Sweden.

Programme

Joint interim meeting starting time (timezones):

15:00 Paris (CET)

19:30 New Delhi (IST)

1:00 Melbourne (AET)

6:00 Los Angeles (PST)

9:00 New York (EST)

14:00 London (GMT)

DAY 1: TUESDAY, FEBRUARY 21, 2023

15:00 - 15:15 (CET) WELCOME & INTRODUCTION	
Kate Seymour, ICOM-CC Chair Anna Laganà, ICOM-CC Modern Materials & Contemporary Art Working Group Coordinator Sarah Benson, ICOM-CC Textiles Working Group Coordinator	
15:15 - 15:45 (CET) KEYNOTE	
Cilla Robach, Head of Collection Unit (Nationalmuseum Stockholm, Sweden)	H&M's Circular Design Story – Contemporary fashion and sustainability, a curator perspective
15:45 - 15:55 (CET) PRESENTATION OF A TOOL FOR SYNTHETIC TEXTILES	
Susan Lambert & Louise Dennis (Museum of Design in Plastics, UK)	A curator's guide to synthetic garments
15:55 - 16:05 (CET) Q&A with Cilla Robach & Susan Lambert / Louise Dennis	
16:05 - 18:00 (CET) PAPER SESSION 1	
Anita Quye (University of Glasgow, UK)	Artificial silk and other fashionable rayons: Early material history and identification guidance for textile conservation
Ilaria Degano, et al. (University of Pisa, Italy)	Modern heritage textiles: An integrated protocol to face new analytical challenges
Louise Garner (University College London, UK)	Identification of synthetic materials in historic garments using ATR-FTIR spectroscopy
Ashley Freeman & Kaoru Yui, et al. (Los Angeles County Museum of Art, USA)	All that glitters is not gold: Study of Lurex, its development, composition, and construction
Q&A	
18:00 - 18:15 (CET) BREAK	
18:15 - 18:55 (CET) VIRTUAL TOUR	
Sjouk Hoitsma, Head of collections & Vera de Pont, Yarn specialist (TextielMuseum, the Netherlands)	Tour of the Textile Museum (Tilburg, Netherlands) and its professional workspace "Make it in the TextielLab"
18:55 - 19:35 (CET) KEYNOTE	
Isabelle Marina Held, Smithsonian Postdoctoral Fellow and Bard Graduate Center Visiting Fellow (USA)	Bombshells, Bullet Bras, Bikinis: Military-Industrial Synthetics and the Body
Q&A	
19:35 - 20:05 (CET) POSTER SESSION 1	
Kasserine Ross-Sheppard (Museum of Transport and Technology, New Zealand)	Searching for synthetics: A review of synthetic materials in MOTAT's textiles collection
Eva Catic (Zenzie Tinker Conservation, Brighton, UK)	Melliand Textilbericht: A technical journal as a sample-book for semi-synthetic fibre materials between 1927-1931
Ingrid Kramer (National Cultural Heritage Institute & Research Laboratory for Historical Monuments, France)	Studies on the effect of accelerated ageing under UV-Radiation on polyamide 6,6: Physiochemical, mechanical and morphological characterization
Q&A	
20:05 - 20:10 (CET) CLOSING OF THE DAY	
Anna Laganà, ICOM-CC Modern Materials & Contemporary Art Working Group Coordinator Sarah Benson, ICOM-CC Textiles Working Group Coordinator	

DAY 2: WEDNESDAY, FEBRUARY 22, 2023

15:00 - 15:05 (CET) INTRODUCTION	
Anna Laganà, ICOM-CC Modern Materials & Contemporary Art Working Group Coordinator Sarah Benson, ICOM-CC Textiles Working Group Coordinator	
15:05 - 16:55 (CET) KEYNOTES	
Gabi Asfour, founder & Creative Director at New York fashion house threeASFOUR, faculty at Parsons MFA textiles, USA	3D printed textiles
Rimzim Dadu, founder of fashion design house Rimzim Dadu (India)	Creating and working with unconventional textiles
Despina Papadopoulou, founder of Principled Design & Adjunct Professor, NYU, Interactive Telecommunications Program (USA)	Encountering the material stack in smart textiles
Q&A	
16:55 - 17:00 (CET) BREAK	
17:00 - 18:55 (CET) PAPER SESSION 2	
Susana França de Sá, et al. (NOVA School of Science and Technology, Portugal)	Mapping polyurethane coated fabrics and damages in fashion collections worldwide by infrared spectroscopy
Danica Auld (National Museum of Qatar, Qatar)	Growing concerns: Biodegradation in a Vivienne Westwood natural rubber dress
Charlotte Holzer, et al. (Deutsches Museum, Germany)	Modern space textiles: Material identification and degradation study of a Russian Sokol KV2
Carmela Lonetti & Phoebe Ignatia (Arts Centre Melbourne, Australia)	The house dress: Comparative analysis of synthetic materials identification using visual and instrumental techniques to inform preservation approaches
Q&A	
18:55 - 19:10 (CET) BREAK	
19:10 - 19:40 (CET) POSTER SESSION 2	
Sahar Foroozanpour (Jondishapour Museum of Trade History, Iran)	Analytical studies of a 20th century historical costume containing synthetic fibres worn by Farah Pahlavi, Queen of Iran
Michelle McVicker & Alison Castaneda (El Museo del Barrio & Museum at the Fashion Institute of Technology, USA)	Plastics under cover: Silicone release paper covers for synthetic leather garments
Karin Hindborg (University of Gothenburg, Sweden)	Stain removal agents: Efficiency and effect on synthetic textiles
Q&A	
19:40 - 20:00 (CET) SPEED EXCHANGE 1	
Moderators: Kendra Roth, Object conservator (Metropolitan Museum of Art, USA) Anna Laganà, Senior Research Specialist (Modern and Contemporary Art Research Initiative, Getty Conservation Institute, USA) Julia Langenbacher, Senior Conservator (Hamburger Kunsthalle, Gallery of Contemporary Art, Germany)	
20:00 - 20:05 (CET) CLOSING OF THE DAY	
Anna Laganà, ICOM-CC Modern Materials & Contemporary Art Working Group Coordinator Sarah Benson, ICOM-CC Textiles Working Group Coordinator	

DAY 3: THURSDAY, FEBRUARY 23, 2023

15:00 - 15:05 (CET) INTRODUCTION	
Anna Laganà, ICOM-CC Modern Materials & Contemporary Art Working Group Coordinator Sarah Benson, ICOM-CC Textiles Working Group Coordinator	
15:05 - 15:45 (CET) KEYNOTE	
Elizabeth-Anne Haldane, Lead Textile Conservator (Victoria & Albert Museum, UK)	The conservation of semi-synthetic and synthetic textile materials at the V&A
Q&A	
15:45 - 17:40 (CET) PAPER SESSION 3	
France-Éliane Dumais & Jennifer Poulin (Centre de conservation du Québec & CCI, Canada)	Degradation of synthetic fibers in a contemporary banner: Conservation and reflections
Deborah Heinrich (Private practice and Staatliche Schlösser, Gärten und Kunstsammlungen Mecklenburg-Vorpommern, Germany)	Raincoats in need: Cleaning and storage of 20th century raincoats made from plasticized polyvinyl chloride
Alison Castaneda (Museum at the Fashion Institute of Technology, USA)	Consolidating polyurethane synthetic leather
Melissa Bolin & Michelle Hunter (Private practice & National Gallery of Australia, Australia)	A Futurist Opera: Assessing the future of Justene Williams opera costumes for use in performance
Q&A	
17:40 - 17:50 (CET) BREAK	
17:50 - 18:50 (CET) VIRTUAL TOUR	
Elizabeth Shaeffer, Assistant Conservator, Christopher Mazza, Assistant Conservator & Kris Cnossen, Gerald and Mary Ellen Ritter Memorial Fellow (The Costume Institute at The Metropolitan Museum of Art, USA)	Virtual tour of the the Metropolitan Museum of Art's Costume Institute
18:50 - 19:30 (CET) SPEED EXCHANGE 2	
Moderators: Kendra Roth, Object conservator (Metropolitan Museum of Art, USA) Anna Laganà, Senior Research Specialist (Modern and Contemporary Art Research Initiative, Getty Conservation Institute, USA) Julia Langenbacher, Senior Conservator (Hamburger Kunsthalle, Gallery of Contemporary Art, Germany)	
19:30 - 19:40 (CET) BREAK	
19:40 - 20:40 (CET) PANEL DISCUSSION: How can we do it? Preserving Synthetics and Semi-Synthetics Textile Materials in Fashion, Design, and Art	
Moderator: Sarah Scaturro, Eric and Jane Nord Chief Conservator (Cleveland Museum of Art, USA) Panellists: Jessica Walthew, Conservator (Cooper Hewitt, Smithsonian Design Museum, USA) Stéphanie Ovide, Textile conservator and researcher (l'Atelier Ovide, France) Anita Quye, Professor of Heritage Science (Kelvin Centre for Conservation and Cultural Heritage Research in History of Art, University of Glasgow, Scotland)	
20:40 - 20:45 (CET) CLOSING OF THE JOINT INTERIM MEETING	
Anna Laganà, ICOM-CC Modern Materials & Contemporary Art Working Group Coordinator Sarah Benson, ICOM-CC Textiles Working Group Coordinator	

Abstracts and Speaker Biographies

DAY 1: TUESDAY, FEBRUARY 21, 2023

KEYNOTE SPEAKERS

CILLA ROBACH

Head of Collection Unit at Nationalmuseum Stockholm

H&M's Circular Design Story – Contemporary fashion and sustainability, a curator perspective

Collecting contemporary craft and design (often made of synthetic manufactured materials) is of course a challenge on many levels. As a curator, my primary aim is to collect items with high artistic quality that are innovative and have the possibility to influence future development. Objects that can tell something about the questions and debates that are important to and shape values in our society today are also a main aspect in the decision to acquire an object. For example, objects that relate to questions on sustainability, identity, politics, or other aspects of daily life.

In this context, the H&M collection: Innovation Circular Design Story (2022) is of great interest to the Nationalmuseum of Sweden due to its relevance in today's culture and highlighting Swedish innovative design. This collection was designed to be treasured, shared, repaired and recycled and a great part of it is made of recycled synthetic materials. Being a successful fashion company worldwide, H&M has an important impact on production development. Using sustainable materials and production methods can have a large impact for many years, and a great part of their "ordinary" supply has been developed with sustainability in mind.

In their smaller, exclusive collections, such as Innovation Circular Design Story, H&M can be even braver and include more research and new materials. They have worked with sustainable materials with the goal of using recycled materials or waste to create garments that can also be recycled once 'used up' without compromising the fashion quality. From the curatorial perspective, this is of great interest to preserve to future generations. However, as is the case with all newly innovative materials, we are aware that there is currently little knowledge on how these new recycled synthetic materials will age in our collection stores.

PHD Cilla Robach, is Head of Collection Unit at Nationalmuseum Stockholm. She has been working there as a curator on 20th and 21st century Craft and Design since 1998 and has curated exhibitions including Swedish Grace – Art & Design in 1920's Sweden (2022), Pär Engsheden and Sara Danius' Nobel Gowns (2020), Hella Jongerius – Breathing Colour (2019), Slow Art (2012) and Konceptdesign (2005). Her dissertation (2010) analyses the craft and design debate in 1960s Sweden. From 2013 – 2016, she worked as headmaster of Beckmans College of Design, where education in Fashion, Visual Communication and Design is provided.



ISABELLE MARINA HELD

Smithsonian Postdoctoral Fellow and Bard Graduate Center Visiting Fellow

Bombshells, Bullet Bras, Bikinis: Military-Industrial Synthetics and the Body

This talk explores the historical connections between synthetics, military-industrial research, and intimate apparel. In 1939, DuPont, at the time the world's largest explosives manufacturer, unveiled stockings made of nylon to the US public. Billed as the "world's first fully synthetic fiber" DuPont intended to set this material apart from earlier semi-synthetic "artificial silks" and promoted nylon as "made of coal, air, and tar." Newspapers circulated exaggerated stories of nylon stockings as "strong as steel, yet fine as a spider's web" feeding into the company's slogan of "Better Things for Better Living... Through Chemistry." However, in 1942 US plastics R&D was annexed by military contracts demanding near-exclusive use of the latest developments, such as nylon for parachutes and mosquito nets.

After World War II with the end of military contracts and rations lifted, chemical companies sought to identify and pursue new markets for their products. Foundationwear companies promoted products as using the latest synthetics improved upon during wartime. Utilizing an intersectional feminist approach focusing on a selection of materials and objects ranging from nylon to the bullet bra, this talk will illustrate how a wide range of makers and users engaged in shaping and dressing the body with synthetic materials. Examples discussed will include a rare pair of 1938 experimental nylon wear test underwear; DIY queer and trans instructional guides to buying, making, and wearing synthetic foundations; and coverage in magazines targeted to a Black readership.

Isabelle Marina Held is an interdisciplinary design historian and curator. Employing an intersectional approach, she focuses on fashion, the body, materiality, and technology in the twentieth and twenty-first centuries. As a Smithsonian Postdoctoral Fellow and Bard Graduate Center Visiting Fellow, she is currently completing her forthcoming book, tentatively titled *Atomic Bombshells: How Plastics Shaped Postwar Bodies*.

The UK Arts and Humanities Research Council funded Held's PhD in History of Design from the Victoria and Albert Museum and Royal College of Art. Held has curated exhibitions for the Science History Institute and Google Arts & Culture as well as lectured at design institutions including London College of Fashion.



PAPERS

Artificial silk and other fashionable rayons: Early material history and identification guidance for textile conservation

ANITA QUYE

Artificial silk is a well-known and much-used historical term that was coined in the 1890s for the first synthetic textiles fibres on account of their shiny, smooth, transparent and fine appearance. For this reason, artificial silk is a common entry in collection and conservation records of modern textiles. It is therefore tempting to continue using the term when documenting twentieth century examples, but in truth, artificial silk over-simplifies and obscures an important group of related fibres, namely the rayons. Moreover, rayon manufacture developments in the 1920s and 1930s were deliberately directed at ensuring that the fibres did not look like silk, in response to consumer tastes, fashionable trends and the textile industry's desire for greater versatility in mass-produced, low-cost domestic products as well as the high-end market.

The upshot is that many rayons are being overlooked in heritage collections of early twentieth century textiles. For conservation reasons relating to wet-strength and static tendencies, artificial silk and other fashionable rayons should be documented more specifically, like viscose rayon or acetate rayon. While certain rayons can be readily identified by scientific instrumental methods, notably molecular spectroscopy and optical microscopy, there are limitations for distinguishing several types with similar fibres chemistries as well as object sampling considerations. In such instances, close observation of the technical construction and decorative effects of fibres in the objects can be highly informative within the historical contexts of early rayon manufacture and commercial product developments. This observational approach can be enhanced by drawing upon accessible visual references in archives and library collections of technical publications from industrial manufacturers and, interestingly, dyers of rayon fibres. Thus, a complimentary approach to identification by scientific analysis and visual characteristics relating fibre use and appearance in manufactured products offers an integrated perspective for early rayons which can be extended to other synthetic fibres in modern textile materials.

This paper focuses on artificial silk and other fashionable rayons and the key developments in their early manufacturing history for commercial textile products from the 1890s to the 1930s. It includes examples of visual characteristics for different rayons in decorative textiles from research of archival and library sources and offers considerations and guidance for their identification for conservation.

Anita Quye is Professor of Heritage Science at the Kelvin Centre for Conservation and Cultural Heritage Research in History of Art, University of Glasgow, Scotland. Her research interests in synthetic plastics, fibres and dyes combine chemical analysis, art history, experimental reconstructions and technical industrial archives to investigate 'everyday' museum artefacts and textiles for interpretation and preservation. Anita's publications and collaborations including 'Plastics: collecting and conserving', Icon's Ethical Sampling Guidance and expert adviser to the Synthetic Garments Project (PHS and DATS, UK) and PlasCO2 (NOVA, Lisbon). She was a Getty scholar in 2022 and is currently writing a handbook of modern materials in popular decorative art and fashion history.

Modern heritage textiles: An integrated protocol to face new analytical challenges

ILARIA DEGANO, TOMMASO NACCI, FRANCESCA SABATINI, FRANCESCA MODUGNO, LICIA TRIOLO, CLAUDIA CIRRINCIONE, MARTA CIMÓ, BARBARA FERRIANI & NANNI STRADA

Since the second half of the 19th century, the world of textile production underwent radical changes both in terms of aesthetics and of the performances, leading to industrial products whose chemical properties were new and unexplored in term of long-term stability. Stage costumes and high-end fashion garments from the 60s onwards are typical examples of multi-material heritage objects where different natural and synthetic materials were included, in some cases in the same garment, to fulfil specific purposes.

The limited stability shown by some artificial and synthetic fibres, plastic materials, and synthetic dyes makes conservation practices highly challenging considering the wide variety of degradation mechanisms in which different formulations may incur, strongly influenced by the presence of additives and exhibition conditions. Stage costumes were also often modified throughout the years to be readapted for different purposes. Thus, a proper knowledge of the chemical composition of the materials is fundamental for characterizing their physical and chemical properties, studying degradation pathways, and fine-tuning suitable preservation strategies and sustainable conservation and exhibition conditions.

In this framework, we developed an analytical strategy based on Optical Microscope observation in polarized light, cross-section examination, Attenuated Total Reflection Fourier Transform Infrared Spectroscopy and finally Pyrolysis Gas Chromatography coupled with Mass Spectrometry for the characterization of the fibers in modern heritage textiles and their state of conservation. If needed, the structure of the metallic threads can be investigated by SEM-EDX, while dye identification is carried out by High Performance Liquid Chromatography coupled with Diode Array Detector and mass spectrometry. The analytical approach adopted allowed us to fully characterize heritage fabrics composed of natural, synthetic, and artificial fibers dyed with complex mixtures of synthetic dyes. Significant examples will be provided, related to the investigation of Italian stage costumes collections and high-fashion design garments.

Ilaria Degano is Associate Professor in Analytical Chemistry at the Department of Chemistry of the University of Pisa. She received her PhD in Analytical Chemistry in 2009 from the University of Pisa (Italy) and her research mainly deals with the characterisation of natural and synthetic organic dyes and pigments employed in works of art by chromatography and mass spectrometric techniques. She has developed analytical and instrumental methodologies for the study of complex mixtures of organic materials and for the understanding of their ageing pathways. She has applied her knowledge to the study of stage costumes and fashion garments, recently.

Identification of synthetic materials in historic garments using ATR-FTIR spectroscopy

LOUISE GARNER, SUSAN LAMBERT & CATHERINE CURRAN

Synthetic fibres have dominated the fashion industry since the early 20th century, consequently, they are increasingly being found in museum collections. The identification of synthetic fibres in collections is important to guide the preservation of synthetic garments as it aids the understanding of how a material will interact with its environment. In this study, we have shown the viability of using Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) as a technique for the identification of a range of synthetic fibres and materials in historic garments. While a few studies have explored the effectiveness of FTIR for analysing fibres, this work evaluates the potential of applying this analysis to a wide variety of real historic fibre samples for identification.

In this study, we analyzed 138 samples from 41 historic garments containing synthetic fibres, as well as several synthetic coatings. The samples were taken from four collections across the UK from garments which span over a 100-year period. Many of the garments were sampled in multiple places, such as linings, sewing threads and coatings in addition to the main fabric to provide a more complete understanding of the total composition of the outfit. Subsequently, we were able to provide a greater understanding of different types of fibre pertinent to a single garment. This method establishes the effectiveness of using ATR-FTIR as a technique to fully characterise historic synthetic fibres through using small invasive sampling.¹

We also present an improved understanding of the various synthetic materials present in modern textile collections providing an indication of the relative abundance of various fibre types. The most prevalent fibres identified were polyester, nylon, and viscose rayon. A total range of 13 different materials was successfully identified, indicating the potential variety of materials within collections. The study also revealed that many of the garments were composed of several different types of fibres including mixtures of natural fibres alongside synthetic materials. Textiles composed of numerous different synthetic and natural materials further compounds of preserving these garments. Overall, this work offers valuable insight into the complexity and prevalence of different types of synthetic fibres within heritage collections

Louise Garner is a second-year PhD student from the UCL Institute for Sustainable Heritage researching synthetic fibre degradation. She received her BA in History of Art with Material Studies (2020) and her MSc in Advanced Material Science (2021) both from UCL. Her current field of research focuses on the relationship between crystallinity and the degradation of regenerated cellulosic fibres from an environmental and heritage perspective.

All that glitters is not gold: Study of Lurex, its development, composition, and construction

ASHLEY A FREEMAN, KAORU YUI, CATHERINE MCLEAN & LAURA MACCARELLI

This paper examines the history, composition, and construction of the modern metallic looking threads referred to as Lurex. Lurex is a 1945 registered trademark for yarn and thread with a metallic appearance, which was originally introduced to the fashion market by the Dobeckmun Company (currently known as the Dow Chemical Company). Today, the term is widely used outside of its trademark to refer to similar treatments of metallic fibers or fabrics. This type of metallized thread is evident in some objects found in the Costume and Textile collection at the Los Angeles County Museum of Art (LACMA). In particular, metallized thread can be seen in textile objects dating to the mid-20th century created by two California-based artists, Maria Kipp (1980-1988) and Dorothy Wright Liebes (1899-1972). However, as some of Kipp's objects are dated prior to the trademark's registration, the use of "Lurex" as a common descriptive term at LACMA was questioned by the curatorial department.

To better reflect the history of Lurex here at LACMA, and to characterize the metallic threads used by Kipp and Liebes, a scientific examination was undertaken. To accomplish this, 31 fibers were obtained from 10 Kipp and four Liebes textiles within LACMA's permanent collection. In this study, a variety of approaches were used to investigate silver and gold fibers, and compare them with two Lurex TM reference materials. The first stage focused on the overall composition of the textiles as well as a microscopic evaluation of the sampled fibers. Once the construction of each fiber was better understood, characterization was performed using X-ray fluorescence (XRF), Fourier transform infrared spectroscopy – attenuated total reflectance (FTIR-ATR), scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS), solubility, and burn tests. The results presented here will assist in a more robust preservation plan for these textiles, in addition to developing a deeper insight into the accessibility of Lurex TM in its early stages of manufacture.

Ashley A Freeman joined the Conservation Center this past February as the Andrew W. Mellon Postdoctoral Fellow in Conservation Science. She recently completed her Ph.D. at the Norwegian University of Science and Technology (NTNU-Trondheim), where she focused on the physical behavior of distemper paint from Norwegian stave churches. Prior to her studies at NTNU, Freeman was a member of the Managing Collection Environments Initiative (2015-2018) at the Getty Conservation Institute. She holds a MAC in Conservation Science from Queen's University, a study certificate for restoration and conservation from the Lorenzo de' Medici, and a MS in Chemistry from Loyola University Chicago.

Kaoru Yui joined LACMA's Conservation Center as Andrew W. Mellon Fellow in Costume and Textile Conservation in September 2021. In 2020, she graduated from the Master of Art Conservation program at Queen's University in Ontario, Canada with a specialization in object conservation. Prior to joining the LACMA's Conservation Center, she worked at several Canadian cultural institutions, including the Owens Art Gallery in New Brunswick, Royal Ontario Museum, and the Canadian Conservation Institute in Ontario. As of April 2023, Kaoru will be serving as a costume/preventive conservator at the Kyoto Costume Institute in Kyoto, Japan.

POSTERS

Searching for synthetics: A review of synthetic materials in MOTAT's textiles collection

KASSERINE ROSS-SHEPPARD

At the Museum of Transport and Technology (MOTAT) in Auckland, New Zealand we are undertaking a review of our textile collection to determine the percentage of objects containing synthetic or semi-synthetic materials. As the collection includes a wide range of modern uniforms, technical fabrics, and protective clothing it seems likely that the percentage of synthetics would be high, however a lack of sustained institutional knowledge around textile identification has resulted in incomplete or inconsistent recording, making the actual number of synthetics difficult to quantify. At a time when we are increasingly looking at measures such as cold storage to help preserve other modern synthetic materials in our collection, understanding the material composition of the textile collection will help determine where it fits in our future storage plans, inform decisions regarding preventive conservation measures, and create expectations around how the collection will age.

The review will first focus on the object records in our collection management database. Reviewing these records will help establish the number of objects currently listed as containing synthetic materials, as well as allowing us to flag any objects that require physical examination due to missing or incomplete information. Once these objects have been examined their records will be updated and the total percentage of objects containing synthetic materials will be determined. In addition to improved object records, developing a more comprehensive materials thesaurus and gaining an increased understanding of our collection, we will also produce a MOTAT textile identification guide to help maintain our institutional knowledge.

Kasserine Ross-Sheppard is a Conservation Technician at the Museum of Transport and Technology (MOTAT) in Auckland, New Zealand. Combining a Masters of Cultural Materials Conservation from the University of Melbourne with a Bachelor of Performing and Screen Arts in Production Design and Management and several years working as a theatrical costumer, Kasserine enjoys opportunities to use both sets of skills while working with the museum's diverse textile collection.

Melliand Textilbericht - A technical journal as a sample-book for semi-synthetic fibre materials between 1927-1931

EVA CATIC

As part of the chemical industry, the development of 'artificial silks'; such as nitrocellulose, viscose, cuprammonium and acetate method were highly revolutionary for the textile industry. The Melliand Textilbericht published by Chemie GmbH provided a platform for sharing new techniques and developments of production processes, prints and dyeing procedures for these new regenerated and semi-synthetic fibre materials. Melliand Textilberichte (MTB) was launched in 1919 by Marcel Melliand in Mannheim, Germany. An international version in English, French and Spanish was introduced in 1927. Until now, the magazine is published as an e-journal on textiletechnology.net.

Importantly, from 1927 until 1940, technical articles were often provided with a sample to demonstrate the novelty of the fabric. These samples, together with a detailed description, are an immensely helpful reference for researchers, curators and conservators to identify semi-synthetic fibre materials, their use and their production process.

The descriptive text also provides vital information about the fibre type, production process, and companies that often do not exist anymore or whose archives got lost during the time. For example, issue 4 from May 1927 of MTB provides several detailed samples of dyed and printed fabrics made by 'Bembergseide' who specialised in regenerated fibres made after the cuprammonium method. In general, 'Bembergseide' is best known for its stockings.

This poster works as an example of how technical journals of that era can provide a source for historians, curators and conservators. The information within these journals gives a deeper understanding of semi-synthetic finished goods that helps to conserve these material groups for future generations.

Eva Catic holds a Master's in Art History and Textile Conservation specialising in early regenerated fibre materials such as viscose-rayon in the German-speaking world. Her research interests include identifying semi-synthetic fibre materials within collections and international methods in textile conservation and their ethical approach. Originally from Austria, Eva currently works as a textile conservator at Zenzie Tinker Conservation, Brighton UK.

Studies on the effect of accelerated ageing under UV-Radiation on polyamide 6,6: Physiochemical, mechanical and morphological characterization

MOHAMED DALLEL, INGRID KRAMER & CHLOÉ RANCHOUX

Various synthetic materials have progressively entered museum collections following their revolutionary invention during the 20th century. Although they used to be considered robust materials, their progressive degradation has lately been witnessed, namely yellowing, alteration of their original shape and loss of mechanical resistance, to only cite a few damages museum professionals are facing. There is a general agreement that further research is required within the field of conservation-restoration since these degradation mechanisms are not fully known and adapted restoration treatments should still be determined.

The present research hence aims at better understanding the ageing of nylon polymers, to help preserve those of cultural heritage relevance. With regards to this material, it has been observed that little literature exists about the photo-degradation of polyamide 6,6 (PA66). Accelerated ageing tests were therefore performed on PA66 for time periods up to 1100 hours with a focus on UV radiations falling within the range of 300-400 nm. The manifestation and extent of degradation upon exposure were observed by means of optical and electron microscopy, vibrational spectroscopy, spectrophotometry and tensile strength tests. Crystalline and amorphous phases were also inspected by X-ray diffraction. Technical examination of the aged PA66 samples revealed signs of alteration with an apparent degraded surface, attested by the development of irregularities at the periphery of the fibers after 250 hours of ageing. Scission of the polymeric and inter-chain hydrogen bonds was noticeable from the vibrational spectra, in which changes occurred in the carbonyl/carboxyl functional groups region that must correspond to the formation of degradation products. These signs of alteration were simultaneously accompanied by a significant deterioration of mechanical properties evidenced by the decrease of the tensile strain and stress at break. To pursue this project, further tests are ambitioned on longer ageing durations to better understand the long-term photo-ageing behaviour of PA66.

Ingrid Kramer, Research fellow at the National Cultural Heritage Institute & Research Laboratory for Historical Monuments, France has pursued a master's in technical art history at the University of Amsterdam (UvA) in partnership with the Rijksmuseum with a focus on the scientific characterization of museum objects. Thereafter, she completed a second master's in conservation science at the University of Paris-Créteil (UPEC), with a focus on the degradation of cultural heritage materials exposed to the environment.

PRESENTATION

A curator's guide to synthetic garments

SUSAN LAMBERT & LOUISE DENNIS

This will be a presentation of the guide which was the result of a collaboration between the [Dress and Textiles Specialists \(DATS\)](#), led by the Victoria and Albert Museum and Glasgow Museums; and the [Plastics Subject Specialist Network \(PSSN\)](#), led by the Museum of Design in Plastics (MoDiP). It has been developed with Art Fund support with additional funding from the British Plastics Federation, Worshipful Company of Horners, and the Plastics Historical Society.

The guide's purpose is to enable participants to improve the documentation and interpretation of collections of synthetic garments and make them accessible to the widest audience. It is intended to be used at DATS and Plastics SSN workshops and as a means of sharing the knowledge communicated in the workshops with colleagues and the wider public. It is also intended as a stand-alone guide for basic synthetic textile identification. Please use it alongside the other PSSN resources ([A curator's guide to plastics](#) and [Confronting plastics preservation](#)) to develop a fuller understanding of the various materials and their needs.

Professor Susan Lambert worked for many years at the Victoria and Albert Museum where she curated the V&A's first global 20th Century Gallery and initiated and oversaw its Contemporary Programmes. In 2007 Lambert was instrumental in developing an existing artefact collection at the Arts University Bournemouth into the Museum of Design in Plastics (MoDiP), where she was Chief Curator.

Louise Dennis is the Curator of MoDiP. As a qualified museums professional, Louise has gained several years' experience working with a range of interesting collections of various materials from those relating to the brewing industry, ceramics, jewellery, historical glassware, and military history. She completed her PhD at the University of Brighton in the academic year 2020 /2021.

VIRTUAL TOUR

Tour of the Textile Museum (Tilburg, the Netherlands) and its professional workspace "Make it in the TextielLab"

SJOUK HOITSMA
Head of collections
VERA DE PONT
Yarn Specialist

In the middle of the TextielMuseum is the TextielLab; a unique textile knowledge centre. As a visitor, you are witnessing what designers, artists and architects are making. The lab offers an exceptional glimpse into the maker's kitchen. New, unique projects are being worked on every day.

www.textielmuseum.nl | www.textiellab.nl

DAY 2: WEDNESDAY, FEBRUARY 22, 2023

KEYNOTE SPEAKERS

GABI ASFOUR

Founder & Creative Director at New York fashion house threeASFOUR, faculty at Parsons MFA textiles

3D printed textiles

Gabi from threeASFOUR will discuss their use of 3D printing in Fashion Design from the point of view of 3D Printed textiles as a tool to create fabric structure as well as garment silhouette.

Partnering with Adi Gil and Angela Donhauser, **Gabi Asfour** founded threeASFOUR in 2005. Recipients of the Cooper Hewitt National Design Award in 2015, threeASFOUR has built a legacy of fusing high technology with traditional craftsmanship to create clothing at the intersection of fashion & art.

Devoted to the creative exploration of collective consciousness and cultural coexistence, the collective has been presenting runway shows, films and performances globally. Their work has been exhibited in various institutions, including the Victoria & Albert Museum, the Met Costume Institute and the Cooper-Hewitt Museum.

The trio have collaborated with numerous brands such as Kate Spade, the Gap, Sony, Epson, Mimaki & Stratasys; as well as various artists such as Matthew Barney & Chuck Close; and several musicians, including Björk, Yoko Ono, Lady Gaga, Rihanna & Mariah Carey.

Gabi is senior faculty at the Textiles MFA program at Parsons and has been teaching “Senior Thesis” since 2011 at the School of Fashion and various courses in the Integrated Design Program, leading external projects such as the partnership with The Baltimore Symphony Orchestra.

Instagram: [@threeASFOUR](https://www.instagram.com/threeASFOUR)

Facebook: <https://www.facebook.com/threeasfour>

Linkedin: <https://www.linkedin.com/company/threeasfour/>



RIMZIM DADU

Founder of fashion design house Rimzim Dadu

Creating and working with unconventional textiles

This presentation will showcase Rimzim's experiments with different materials to create unconventional textiles. Rimzim's work focuses on understanding the material and transforming the very nature of a material. For example, steel becomes soft and malleable and chiffon becomes structured and grunge. The presentation will also focus on her work with silicone and how she has re-engineered it to handweave a traditional Jamdani Sari. Through this presentation she aims to showcase the challenges, triumphs and gained experience of her journey so far.

Rimzim Dadu the brand is a living archive of the designer's innovation through surface textures whilst discarding convention and keeping a design philosophy that pays homage to traditional techniques and materials by way of deconstruction and re-engineering.

The brand is used as her playground for experimentation of surface developments and allowing her vision to take tactile forms. The design philosophy is led by instinct which lends to an alternative perspective in the use of traditional materials by the way of unorthodox yet intuitive hand craft techniques. Often this involves deconstruction, modification and reassembly into a new form. Common design details feature micro elements being enlarged into macro proportions or on a similar strain, printed patterns being built into three dimensional surfaces.

Dadu's work has been showcased at the prestigious Victoria & Albert Museum and she has won many accolades including two Elle Style Awards, Grazia Young Designer Award and FICCI YFlo Young Achiever Award.

Instagram: [@rimzimdaduofficial](https://www.instagram.com/rimzimdaduofficial)

Website: www.rimzimdadu.com



DESPINA PAPADOPOULOS

Founder of Principled Design & Adjunct Professor, NYU, Interactive Telecommunications Program

Encountering the Material Stack in Smart Textiles

While e-textiles and what is generally referred to as smart garments have been around for over two decades now, important challenges remain in their construction and categorization. The complex stack of materials involved in the making of such artifacts and the lack of standardised interconnects or construction techniques means that often designers and engineers resort to DIY solutions, use materials that lack complete data-sheets and industry standards are still in flux. Through a series of case studies Papadopoulos will review the landscape of materials and processes used in the making of smart garments and highlight some of the key issues around their development.

Despina Papadopoulos is a designer and researcher working at the intersection of embodied sensing systems and emerging materials and their relationship to meaning-making. She has engineered novel solutions for soft-to-hard interfaces, pioneered applications and processes for a stack of smart polymer technologies, and developed award-winning wearable environments that explore intimacy, ambiguity and markers of aliveness in encounters with technological systems. She has collaborated and developed projects with Lubrizol, Nivea, Ralph Lauren, Bless, and with engineers, fashion designers, quantum physicists, weavers, molecular engineers, and philosophers. She consults C-suite executives on innovation methodologies, business opportunities in emerging technologies, and new product introduction roadmaps.

She has been teaching at NYU's Interactive Telecommunications Program for the past 18 years, where she developed the course and upcoming book *The Softness of Things: Technology in Space and Form* and is a founding faculty at SVA's MFA on Design for Social Innovation. She is currently working on *The Unruliness of Matter*, turning the conceptual and the abstract into the tangible and sensory, as part of her practice-led research Ph.D. at the Royal College of Art, on a TECHNE Fellowship from the National Productivity and Innovation Fund, UK.

Websites: principled-design.com & pixelpeppy.com



Mapping polyurethane coated fabrics and damages in fashion collections worldwide by infrared spectroscopy

SUSANA FRANÇA DE SÁ, JOANA TOMÁS FERREIRA, KIM VERKENS, ELINE VAN DER VELDE, INÊS CORREIA, ADRIANA RIZZO & GLENN PETERSN

Fabrics showing synthetic coatings have been found in fashion museum collections worldwide. These coated fabrics often show damages such as stickiness, blooming, and peeling, causing the permanence of iconic pieces in storage or even the classification of important cultural items as 'total losses'. These damages have been commonly found in fabrics with thermoplastic polyurethane (TPU) coatings as sticky liquid products detected at the surface (sweating and stickiness), white deposits with crystalline appearance (blooming), or as detachment of the coating layer from the substrate (peeling). All these cases lead to drastic aesthetic changes of fashion garments and accessories that so far, have no studied solutions. Even though this severe problematic has been reported by renowned museums, there is still a gap of knowledge regarding the chemical composition of these coatings, the possible fabrics stratigraphy variance, the causes promoting such damages and possible correlations between TPU damages, production dates and wrapping conditions in storage.

The funded research project 'Glossy Surfaces' is filling this gap by conducting a thorough infrared spectroscopy survey of case studies from a large set of museums: MUDE – Museum of Fashion and Design (PT), Mode Museum (BE), Metropolitan Museum (USA), André Courrège Archive (FR), Palais Galliera Museum (FR) and Rossi Moda Museum (IT), gathering more than fifty case studies, including garments and shoes, and pieces covering the 1960s to 2020s. The Glossy Surfaces is addressing this urgent need in conservation through a comprehensive assessment by imaging (digital photography and optical microscopy) and infrared spectroscopy (exploring mostly attenuated total reflection but also external reflection modes).

So far, TPUs have been detected in artificial leathers, glossy-look textiles, waterproof fabrics, and technical textiles, among others, indicating a wide range of unexpected materials in fashion collections. These damages have also been observed in objects independently on their recent or older date and correlations have been proposed regarding types of damages and types of TPUs.

This accurate characterisation of TPU-based fabrics and damages is here provided, promoting advances on future conservation studies focused on actions of removing of sweat and bloom, and contributing to the defeat of the insecurity reported by conservators when dealing with these drastic cases.

Susana França de Sá is an Assistant Professor at the Department of Conservation and Restoration at NOVA, working in the conservation of modern materials and contemporary art. Establishing conservation strategies for urgent needs in museum collections holding challenging materials such as plastics, foams, rubbers and more recently, coated fabrics has been the core of her research. Her investigation has been focused on the preservation and history of plastics, and development of novel and green solutions for their long-term preservation and conservation.

Growing concerns: Biodegradation in a Vivienne Westwood natural rubber dress

DANICA AULD

The Victoria and Albert Museum's acquisition of a Vivienne Westwood dress made from natural rubber prompted an investigation into the causes of several black powdering areas developing through the material. While rubber objects have been troubling conservators for some time, the signs of biodegradation from this object spurred research into an underexplored mechanism in the rubber conservation field. An interdisciplinary review of the rubber conservation, rubber industry and rubber waste biodegradation literature with an examination of the degradation in the case study, has been used to understand the relationship between rubber composition, degradation and treatment. The processing of the locally made Brazilian natural rubber sheets has been better understood with research from the rubber industry, which explores how composition and manufacture influences susceptibility to microbial attack. Rubber can have complex formulations including additives to manipulate the properties of the final material, with some compounds and production methods heightening the risk of biodegradation. The severity of microbial attack on rubber has been demonstrated in studies on the breakdown of rubber products, with various microorganisms capable of breaking the carbon backbone of the material in both moderate and more extreme temperature and humidity ranges. The black discolouration through the rubber of the Westwood dress shows how biodegradation can weaken, damage and disfigure. Better understanding of the biodegradation risk and how various degradation processes have acted in synergy, reveal the need to balance the prevention strategies between several deterioration pathways as the dress continues to be cared for at the Victoria and Albert Museum. The pervasiveness of rubber in everyday life and the numerous applications it has ensures that this material will continue to be incorporated into museum collections and will pose ongoing and novel challenges for custodians as it degrades.

Danica Auld currently works as a Textile Conservator at the National Museum of Qatar, with an interest in the variety of materials which continue to be added to our collections. She has previously worked for the Museum of Applied Arts and Sciences, the Victoria and Albert Museum and ACT Historic Places, Australia. Danica completed her Master's in Textile Conservation from the University of Glasgow in 2020, and a Bachelor's in Heritage, Museums and Conservation in 2016, followed by an Honours dissertation in 2017 from the University of Canberra.

Modern space textiles: Material identification and degradation study of a Russian Sokol-KV2

CHARLOTTE HOLZER, EVA MARIASOLE ANGELIN, ANNA MICHELUZ & MARISA PAMPLONA

The Sokol-KV2 space suit at the Deutsches Museum belonged to the cosmonaut Klaus-Dietrich Flade, who used it during flights to and from the space station MIR with a Soyuz spacecraft (March 1992). It is a highly valued object from the permanent space exhibition, representing high-performance protective clothing exemplary of Russian space technology. The suit provided a safe environment in case of cabin depressurization and allowed simultaneously cosmonaut mobility. These requirements were achieved by an outer restraint layer and an airtight inner layer. Depending on the location, the space suit has further layers with complex stratigraphy.

The object came to the museum in 1994 showing signs of degradation, i.e., discoloration, that worsened within 20 years of display. The damage phenomena observed in the suit are typical for Sokol space suits, which have been similarly produced since the 1970s. Since Russian space suits are less studied from a conservation perspective than their US counterparts, this research represented the opportunity to develop a deeper understanding of the materials used and possible causes for their alteration.

To this end, a multi-analytical approach was adopted. Macroscopic and microscopic observations, textile analysis following the CIETA system and mapping of materials highlighted the complex stratigraphy and degradation forms. Synthetic fibers, coating materials and other synthetic polymers were identified with ATR-FTIR. The fibers of the restraint layer are mostly made of PET, while PA was found in elbows, pockets and tube covers. Two coated textiles were used as an airtight inner layer: mainly PA coated with natural rubber (NR) co-vulcanized with chlorosulphonated polyethylene (CSM) and cotton coated rubber in the frontal opening area. Textile materials from the Russian production company NPP Zvezda were available for investigation. ATR-FTIR investigation of the reference NR-CSM/PA supported the identification of the airtight inner layer of the suit. Additionally, SEM images displayed good adhesion between NR-CSM and PA, highlighting its suitability as an airtight barrier and high-performance textile. Other synthetic polymer-based materials are PVC (tubes and cables) and vulcanized/synthetic rubber (fingers of the gloves, ventilation tubes).

Discoloration was noticed in the PET and PA fabrics of the restraint layer. Special attention was given to the severely discolored PA from the elbow, which evenly turned yellowish/orange, and PA from the ventilation tube cover, which became brown throughout. ATR-FTIR analyses were inconclusive in disclosing the molecular degradation responsible for these discolorations. Since in both cases a rubber layer is present under the PA fabric, microsamples of PA and rubber from those areas were analyzed by EGA-MS and double shot GC/MS. Additives from the rubber layers were detected on the PA fabrics, which, in addition to the degradation products of the rubber material, can be responsible for the PA discolorations. Besides the rubbers' decay, the possible enhancement of damage considering the operating and/or environmental conditions during the space flight and the past museum's display conditions, are discussed.

Joining textiles studies and conservation science of modern materials set the basis for understanding the manufacturing techniques and damage phenomena in Russian Sokol space suits.

Charlotte Holzer is a textile conservator with a special interest in protective clothing. She holds an M.A. in conservation-restoration from the University of Applied Arts Vienna and a PhD from the Technical University of Munich. In her current role as conservator for the aviation, space, and maritime exhibitions of the Deutsches Museum, she puts her research focus on technical textiles.

Anna Micheluz is a conservation scientist working at the Deutsches Museum (DM). Her research focuses on the characterization of organic materials, i.e., plastic objects, by means of pyrolysis-gas chromatography-mass spectroscopy. She is also involved in the management of the analytical laboratory of the conservation science department of the DM, including thermogravimetric analysis coupled with infrared spectroscopy and gel-permeation chromatography. She studied chemistry for conservation and restoration at the Ca' Foscari University of Venice (Italy) and hold a PhD (2016) in environmental science about biodeterioration phenomena inside libraries and archives (Ca' Foscari University of Venice).

The house dress: Comparative analysis of synthetic materials identification using visual and instrumental techniques to inform preservation approaches.

CARMELA LONETTI, PHOEBE IGNATIA, BRONWYN COSGROVE & PETRONELLA NEL

The importance of plastic identification in museum collections, particularly textiles, has become increasingly critical for preserving modern materials. Visual assessment of these materials by analysing physical morphology, degradation characteristics, and other information such as likely date of manufacture continues to be conservators' main way to identify plastics in collections without access to instrumental analysis. During the COVID-19 lockdown period of 2020, Arts Centre Melbourne, Australian Performing Arts Collection (APAC) offered a 'remote' research-based internship to Phoebe Ignatia, a student completing her Master's in Cultural Materials Conservation at the Grimwade Centre, University of Melbourne. Using information from the collection database, a virtual on-line condition assessment, curatorial knowledge and information from the costume designer, Phoebe undertook a research-based inquiry titled "Plastics in the Barry Humphries Costume and Accessories Collection, Australian Performing Arts Collection (APAC)". Whilst the investigation considered the entire Humphries' Collection, The House Dress costume, designed by Stephen Adnitt and worn by Humphries' character Edna Everage in the game show Neighbourhood Watch in 1992-1993 was used as a case study. Acquired by APAC in 1999, the costume comprising a dress, collar, and Lycra tights is a complex construction of a variety of synthetic textiles and materials including foams, laminated vinyl, transparent plastics, and adhesives.

This paper compares the identification of synthetic materials in the House Dress, using remote visual assessment techniques, with identification of materials data obtained using Fourier Transform Infrared Spectroscopy (FTIR). The advantages and disadvantages of each technique are discussed and the efficacy of developing treatment and preservation strategies using information obtained from each methodology.

Conservation of this costume poses ethical considerations including the potential removal of degraded materials. This paper discusses how drawing on other sources of information such as significance, original designs and documentation, ongoing purpose and potential collaboration with the designer can inform a sustainable conservation approach for this costume.

Carmela Lonetti is currently employed as an Object Conservator at Arts Centre Melbourne, where she works in the conservation team caring for the Australian Performing Arts Collection and the Public Art Collection. Her interests include the conservation of modern synthetic materials and sustainable approaches to conservation practice. Prior to her current role, Carmela worked for several years as an Object Conservator at the Grimwade Centre for Cultural Materials Conservation, Commercial Services, University of Melbourne.

Phoebe Ignatia is a recent conservation graduate currently working as an Assistant Conservator at the Arts Centre Melbourne. During her studies, an internship at the Arts Centre Melbourne and a Minor Thesis focused on problematic plastics within textile collections focused on textiles and plastics conservation. Since graduating she has worked at the National Museum of Australia and with Private Textiles Conservation Consultant Patricia Moncrieff.

POSTERS

Analytical studies of a 20th century historical costume containing synthetic fibres worn by Farah Pahlavi, Queen of Iran

SAHAR FOROOZANPOUR, KHOSRO ROODANI & ABDOLBASIR HOSSEINBOR

Garments and clothing as an expression of history is an important part of the cultural and artistic heritage of any society. Many of these, especially those belonging to royalty, contain metal elements. The protection and care of these works, which adorn museums and collections, is particularly important. Due to poor storage conditions, many of these garments have lost their original strength, turned opaque, dark, dull and the passementerie on the clothes has been damaged. Our research examines a NAIMA caftan worn by the queen of Iran, Farah Pahlavi (1959-1978) and designed by Naima Bennis of Morocco (1940-2008) containing synthetic fibers.

In the 20th century, a large quantity of clothing was prepared and produced with synthetic fibers. Today, modern fibers are present in museum collections and are an inseparable part of our heritage. Synthetic fibers have specific degradation phenomena. Currently this dress belongs to a personal collector and has been given to the conservation and restoration department of the Jondishapour museum of trade history for study and examination. Due to irreparable damage, it is imperative that the composition of the metal decorations must be known prior to conservation treatment. Several analytical techniques, including solvent tests, microscopic observations of the longitudinal section of fibers, scanning electron microscope (SEM), and Fourier transform infrared (FTIR) spectroscopy were used to test fibers of the main fabric and those used in passementeries.

Sahar Foroozanpour holds a Master's of conservation and restoration of cultural and historical objects. Since 2018, he has worked as the Manager and Director of Jondishapour Museum of Trade History since 2018. Prior to this, he was the Manager of the restoration workshop of the Roodani private museum. He has conserved more than 4000 objects of public and private museums in Iran and worked on several important projects, including the conservation and restoration of the Atigh Central Mosque, and the Sheikh Roozbehan Tomb.

Plastics under cover: Silicone release paper covers for synthetic leather garments

MICHELLE McVICKER & ALISON CASTANEDA

Since its invention in the early 20th century, synthetic leather has found its way into a large variety of fashion objects, such as shoes, belts, trim, and even entire garments. Consequently, it is a common material in museum fashion collections.

Synthetic leather is most commonly made from polyurethane (PU) or Polyvinyl Chloride (PVC), both of which leach plasticizer as they age. This plasticizer causes the material surface to become tacky, posing the risk that the object will adhere either to itself or an adjacent object. Because there is no known way to prevent or reverse this process, containment through a cover is the best solution. While materials such as polyethylene sheeting or Mylar can protect adjacent objects, these materials can themselves adhere to the plasticizer, causing damage to the synthetic leather. Constructing the cover from a silicone-impregnated material is therefore necessary. Amongst available archival materials, silicone release paper was chosen for its physical properties, price point, and, most importantly, its sewability.

Developing a construction method for covers made of paper required much trial and error. They needed to be removable without requiring excessive manipulation of the object and they needed to be strong enough to withstand multiple rounds of putting on and taking-off. Also, because the silicone release paper has no give or drape, they needed to fit snugly with little to no ease. Ultimately, the most effective design was reminiscent of medieval laced garments: reinforced hole-punched tabs secured with $\frac{1}{4}$ " twill tape. Due to the tailored nature of each cover, it was not possible to create a pattern or pre-make any parts. Furthermore, because synthetic leather stiffens with age, it was desirable to keep these objects as free from creases and folds as possible. To that end, interior supports were used where necessary. Cuffs were shaped with mylar rings and A-line skirts held out with shaped archival board. Although most of the pieces shown in this poster date from the 1960s, the use of Polyurethane and PVC in garments remains prevalent. It can therefore be expected that the need for these covers will increase with time.

Alison Castaneda has been the associate conservator at the Museum at the Fashion Institute of Technology in New York since 2018. She was previously a Kress Fellow in conservation at The Textile Museum in Washington, DC and worked for eight years as a conservator at the Textile Conservation Workshop in South Salem, New York. She holds a BA from Fordham College at Lincoln Center in New York in History and French and an MA from the Fashion Institute of Technology in Fashion and Textile Studies: History, Theory, Museum Practice, with a concentration in textile conservation.

Michelle Mcvicker is the Permanent Collections Associate Registrar at El Museo del Barrio. She previously worked as the Collections and Education Assistant at the Museum at The Fashion Institute of Technology. She was also a Smithsonian Cultural Heritage Fellow at The National Museum of American History, and a Collections Management Assistant at The Costume Institute at The Metropolitan Museum of Art. She received her Fashion Studies MA at Parsons School of Design in 2017. Her research interests include how material culture, specifically clothing, embodies ever-evolving Latinx in the United States.

Stain removal agents: Efficiency and effect on synthetic textiles

KARIN HINDBORG

In the spring 2023 a pilot study will be performed in the form of a master's thesis in conservation of modern materials at the University of Gothenburg. The study will investigate the efficiency and effect of different stain removal agents on stains and polyester fabric.

The pilot study will focus on the removal of different stains on woven polyester fabric. It will be an experimental study where different stains along with a variety of stain removal agents will be investigated. Different versions of accelerated ageing will be performed, ageing before staining, staining before ageing and ageing, staining, and ageing the aged fabric with new stains. The analytical techniques that will be used are tensile strength testing and colour/whiteness measurements by spectrophotometry. Parts of the analysis will be performed at the Swedish National Heritage Board as part of a Guest Colleague program. The paper *Effects of Stains and Stain Removal on Historical Textiles* by Ágnes Tímár Balázs and Györk Mátéfy published in 1993 has been used as inspiration for the design of the study.

Karin Hindborg has a bachelor's degree in Child and Youth Education as well as in Conservation of Cultural heritage Objects, both at the University of Gothenburg. She is currently studying the Masters Programme in Conservation of Cultural Heritage Objects with Specialisation in Modern Materials, also at the University of Gothenburg. At the ICOM-CC triennial conference in Beijing she published the paper "Electrolytic Cleaning of Silver Threads – Effects of Electrolytes on the Condition of Silk". Karin lives in Sweden, where she owns her own textile conservation company.

DAY 3: THURSDAY, FEBRUARY 23, 2023

KEYNOTE SPEAKERS

ELIZABETH-ANNE HALDANE

Lead Textile Conservator, Victoria & Albert Museum

The conservation of semi-synthetic and synthetic textile materials at the V&A

The Victoria and Albert Museum appointed its first plastics conservator in 1992, a role that soon developed into the post of polymer scientist. Initially the focus was on identifying synthetic and semi-synthetic materials in the various collection types held by the V&A and implementing preventive measures for the most vulnerable categories. Raising awareness of how different synthetic materials deteriorate and an understanding that standard treatments for natural materials could damage plastics, led to a much more cautious treatment approach and a more conservative approach to collecting materials that may have a short life span in the museum. This has also been the approach taken when dealing with the semi-synthetic and synthetic textile materials found in the fashion, textile, and performance costume collections at the V&A.

A wide variety of textile fibres can be found in the outer layer of a garment, as linings or hidden as part of the construction; sometimes they are mixed with natural fibres or with other synthetics to enhance the properties of the textile for example, by making it more hard-wearing or to impart elasticity. Fashion and theatrical costumes are often embellished with plastic decorations and fastened with plastic buttons or zips. Synthetic and semi synthetic materials feature in millinery, shoes, and bags; accessories that have all had dedicated V&A exhibitions within the last 15 years. In addition, the temporary exhibition programme at the V&A has increasingly featured 20th century fashion and theatrical costumes requiring the textile conservation team to investigate and treat a wide range of semi- synthetic and synthetic materials. This paper will present an overview of key projects carried out by textile conservators at the V&A, focusing on interventive treatments and highlighting the importance of collaboration with polymer scientists, conservators from other disciplines, and curators to understand and care for the collections.

Elizabeth-Anne Haldane ACR graduated with an MA in Conservation from the Royal College of Art/Victoria and Albert Museum Conservation Course in 1999. She worked at Glasgow Museums, the National Museums of Scotland, and the Fine Arts Museums of San Francisco before taking up a permanent post at the Victoria and Albert Museum in 2002, promoted to Senior Conservator in 2005 and Lead Textile Conservator in 2021.



Degradation of synthetic fibers in a contemporary banner: Conservation and reflections

FRANCE-ÉLIANE DUMAIS & JENNIFER POULIN

In 2018, the textile workshop of the Centre de conservation du Québec restored a decorative mural banner entitled *Wedding Night*, created by the American artist Norman Laliberté. This contemporary work, which dates from the 1970s, belongs to a private collection. The banner is made up of two woven panels, sewn together back-to-back. The green and orange front panel is decorated with appliqué patterns made of pieces of fabric, sewn to the textile panel. Several decorative elements adorn the work, including the representation of a couple present in the center of the banner.

We observed during the examination of this work, that the threads of an area of the banner were changing color from green to black, and yellow particles were present on the surface of the threads that had turned black. Yarn samples were taken and sent to the Conservation Science Division of the Canadian Conservation Institute (CCI), which analyzed the fibers and dye components to determine the cause of this change. These analyzes were carried out using different scientific techniques. The results of these analyzes show that an advanced degradation of the polypropylene yarns used in the manufacture of this work causes these physical and morphological changes.

In this communication we will present the detailed results of the scientific analyzes carried out on the fiber samples, as well as the implications that these results had on decision-making during the conservation treatment of the banner.

France-Éliane Dumais has worked at the Centre de conservation du Québec as a textile conservator since 2010. Previously, she worked for several years in various museums as a collection manager. She is also a specialist in the study and analysis of pre-Columbian textiles, having worked for several years on various archaeological research projects in Peru. She studied for a bachelor's degree in anthropology and a master's degree in archeology at the Université de Montréal. Her research topic focused on the technology of plain fabrics and particularly undecorated Mochica fabrics from the north coast of Peru, dated from the 5th to the 8th century CE.

Jennifer Poulin is a Senior Conservation Scientist at the Canadian Conservation Institute (CCI). She specialises in the analysis of organic components in cultural heritage objects using gas chromatography-mass spectrometry (GC-MS) and pyrolysis-GC-MS. Jenny developed a methodology for the identification of natural and early synthetic dyes on textiles using GC-MS, and this has been a primary research interest for her. She is passionate about textiles and the stories that they can tell us about past cultures and technologies. Currently her work includes characterising and understanding the degradation of modern materials, particularly those used in textile objects.

Raincoats in need: Cleaning and storage of 20th century raincoats made from plasticized polyvinyl chloride

DEBORAH HEINRICH & FRIEDERIKE WAENTIG

Plasticized polyvinyl chloride (PVC) sheets are frequently part of textile collections as accessories but also in the form of entire garments like raincoats. They pose ever new conservation challenges, and not only because of their diversity of formulations. Due to their low material thickness as well as their characteristic chemical instability, PVC sheets are among the most fragile plastics in museum collections. The non-static three-dimensional shape of clothing can further complicate handling and storage. Thus, clothes made from PVC sheet places high demands on conservation methods.

This project investigates as a case study two of the most common preservation problems in handling PVC within the context of textile collections: Cleaning and Storage. For this purpose, two raincoats made of plasticized PVC sheet from the collection of the Deutsches Kunststoffmuseum are in focus of this research. One of these two coats is made of transparent sheet, fully sewn with silk threads. Therefore, and because of its silhouette, it is dated to the late 1940s to 1950s. The second coat, on the other hand, is made of black opaque sheet and completely welded as well as glued. Based on the way it was made and its cut it is dated to the 1970s.

A cleaning concept for the coats heavily soiled surfaces is being developed based on a three-part series of tests. Within this, different dry and wet materials known from conservation practice as well as from the specialist literature are tested. These are first tested separately and then combined in a further test. The evaluation of the tests is based on various complementary measurement methods (including FTIR spectroscopy, gloss measurement, thickness measurement) as well as an optical assessment via stereomicroscope photos.

Based on the series of experiments, a method for gentle wet respectively moist cleaning of the PVC sheets is developed. Despite the different composition and aging of PVC sheets, which must be taken into account, it is shown that a mist-moist cleaning facilitates the sliding of the cleaning material over the surface and thus leads to fewer scratches. Based on literature research a storage method for the raincoats is developed. The preservation of the three-dimensional shape even when the sheet of the object stiffens, as well as the interaction between the object and the storage material were taken into account. The storage concept is based on research in the specialist literature of material and conservation science. The general conditions of the long-term storage have to inhibit further degradation of the material as much as possible, preserve the three-dimensional shape of the flexible object and allow regular monitoring without time-consuming and potentially risky handling. The method corresponds in its type and choice of materials to the current state of research and can be adapted for other garments made of PVC.

Deborah Heinrich is working as a museologist at the Staatliche Schlösser, Gärten und Kunstsammlungen Mecklenburg-Vorpommern since 2021. After completing her Masters degree in restoration and conservation at the TH Köln in 2022, she is working part-time as a freelance conservator. After her studies in textile conservation, she focused in her Master's studies on plastics, in particular on rubber and PVC in the context of textile collections. She gained substantial practical experience by working in various conservation studios, such as the Museum für Hamburgische Geschichte in Hamburg, the Germanisches Nationalmuseum in Nuremberg and the Bevaringtenestene in Salhus.

Consolidating polyurethane synthetic leather

ALISON CASTANEDA

This presentation will revisit the treatment of a synthetic leather wrestling costume owned by World Wrestling Entertainment (WWE). The findings were originally presented as a poster at the American Institute of Conservation 2014 annual meeting but will be presented again here at the ICOM-CC joint interim meeting to reach an expanded audience.

The centerpiece of this presentation is a costume worn by WWE wrestler Shawn Michaels as ring entrance gear. It dates to around 1990. It was sent in 2013 by the WWE archives to the Textile Conservation Workshop in South Salem, NY. The synthetic leather was powdering and flaking badly, with limited amounts of the “skin layer” remaining on the fabric substrate. Furthermore, residue from the degraded synthetic leather coated much of the metal chain and medallion elements.

Using manufacturing history as a starting point, it was determined that the synthetic leather was either polyvinyl chloride (PVC) or polyurethane (PUR). Additional scientific testing showed that the material was polyester-based PUR on a nylon knit substrate. It was not expected that the loose flakes could be re-adhered, but it was desired that the remaining synthetic leather be stabilized. Given the physical properties of the extant synthetic leather, it was determined that an adhesive delivered with an ultrasonic nebulizer would be the best option. To this end, mock-ups were created using some of the detached flakes and newly purchased nylon knit fabric. The following adhesives were tested for suitability: Gelatin, B72, Plextol B500, and Impranil DLV. Only B72 and Impranil DLV adhered the heavy flakes to an acceptable degree, and of the two, Impranil DLV left the nylon substrate more flexible. The costume was ultimately consolidated with a 24% solution of Impranil DLV in water and packed in a customized storage to be safely viewed and studied.

Alison Castaneda has been the associate conservator at the Museum at the Fashion Institute of Technology in New York since 2018. She was previously a Kress Fellow in conservation at The Textile Museum in Washington, DC and worked for eight years as a conservator at the Textile Conservation Workshop in South Salem, New York. She holds a BA from Fordham College at Lincoln Center in New York in History and French and an MA from the Fashion Institute of Technology in Fashion and Textile Studies: History, Theory, Museum Practice, with a concentration in textile conservation.

A Futurist Opera: Assessing the future of Justene Williams opera costumes for use in performance

MELISSA BOLIN & MICHELLE HUNTER

For the 20th Biennale of Sydney in 2016, the Meanjin/Brisbane-based artist Justene Williams collaborated with Sydney Chamber Opera's Huw Belling to stage a reinvention of the 1913 Futurist opera *Victory Over the Sun* originally composed by Mikhail Matyushin. In the original 1913 performance the set and costumes were designed by avant-garde artist Kazimir Malevich using cardboard and wire. Inspired by and expanding upon Malevich's 1913-character sketches the costumes Williams created for the 2016 reinvention consisted of 38 characters (20 original characters with some duplicated). Williams used found objects, unconventional and synthetic materials in bold colours and geometric shapes to construct these costumes. Many materials were combined within a single costume and some examples include perforated and metallic vinyl, laminated foams, neoprene, metallic underlay, and Lycra.

In 2022 the National Gallery of Australia acquired and restaged this performance as part of the Gallery's 40th birthday celebration. The costumes were collected as an auxiliary element to the performance with the intent that they only would be used during performance. This challenged our thinking and approach to the costumes as we were tasked with the unconventional role of assessing the wearability of the 2016 costume components, some of which had begun to deteriorate. This included assisting with the dressing of performers during rehearsals and performance, altering costumes to fit individual performer requirements, and remaking and reworking costume elements under the guidance of the artist.

As the costumes were collected as an auxiliary element this also meant that the costumes could be remade if required. Due to this it was necessary to understand and preserve the information held within the materials and construction methods used to create these costumes rather than the physical material of the costume. This involved data collection through material identification, pattern making, construction diagrams and collaborating with the artist to best preserve the artist's intent for future performances.

Melissa Bolin is a textile conservator based in Canberra, Australia. She completed a Bachelor of Cultural Heritage Conservation through the University of Canberra before attending the University of Glasgow to complete an MPhil Textile Conservation. As part of her MPhil, she undertook a summer internship at the Victoria and Albert Museum. Since returning to Australia in 2015 she has worked at Art and Archival as the textile conservator as well as working at the National Museum of Australia and the National Gallery of Australia as a contract textile conservator.

Michelle Hunter is a graduate of the MPhil Textile Conservation at the University of Glasgow. She has worked as a Conservation Assistant at Windsor Conservation and was the 2017-2018 Post Graduate Intern in textiles at the Canadian Conservation Institute. She has been a textile conservator at the National Gallery of Australia since 2019.

VIRTUAL TOUR

Virtual Tour of the Metropolitan Museum of Art's Costume Institute

ELIZABETH SCHAEFFER

Assistant conservator

CHRISTOPHER MAZZA

Assistant conservator

KRIS CNOSSEN

Gerald and Mary Ellen Ritter Memorial Fellow

Join us for a look at The Costume Institute's conservation lab and hear about some of the challenges we face with synthetic materials from our collection. We will discuss recent projects to identify and properly store objects, the use of anoxic storage environments, and our fellow's current research project on nylon.



Elizabeth Shaeffer has been an assistant conservator at The Metropolitan Museum of Art's Costume Institute since 2019. Before joining The Met, she was associate conservator at the George Washington University Museum and The Textile Museum in Washington DC, and Andrew W. Mellon Fellow in Textiles Conservation at the Los Angeles County Museum of Art. Elizabeth is currently a NATCC board member and was previously editor of the American Institute for Conservation Textile Specialty Group Postprints. She holds an MS from the Winterthur/University of Delaware Program in Art Conservation.

Christopher Mazza has worked at the Costume Institute since 2015. In addition to his work on in-house exhibitions, he focuses on the preventative care of the costume collection. He holds an MA in fashion and textile studies from the Fashion Institute of Technology and an MFA in writing from the University of Alaska. Prior to joining The Met, he was the Andrew W. Mellon Fellow for Advanced Training in Textile Conservation at the Museum of Fine Arts, Boston.

Kris Cnossen is a fellow at the Costume Institute at the Metropolitan Museum of Art. They graduated in 2022 from the Winterthur/University of Delaware Program in Art Conservation, specializing in textiles with a focus in modern art and materials. They have interned at the Indianapolis Museum of Art at Newfields, St. Louis Museum of Art, Toledo Museum of Art, and Mountain States Art Conservation. After their fellowship, they will be starting a private practice in Michigan.

PANEL DISCUSSION

How can we do it? Preserving Synthetics and Semi-Synthetics Textile Materials in Fashion, Design, and Art

Conserving synthetic and semi-synthetic textiles is challenging. Often containing inherent vice, these materials can dramatically degrade, causing the appearance and meanings of textile artifacts to shift over time. This panel looks at the larger questions of what it means to try to conserve synthetic and semi-synthetic textiles and how practitioners can approach their work with confidence.

MODERATOR

Sarah Scaturro is the Eric and Jane Nord Chief Conservator at the Cleveland Museum of Art. She is also a Doctoral candidate at Bard Graduate Center writing her dissertation on the history of fashion conservation.



PANELLISTS

Jessica Walthew is a conservator at Cooper Hewitt, Smithsonian Design Museum. At Cooper Hewitt she works with the Product Design and Decorative Arts and Digital departments, with particular research interests in digital media, plastics (especially bioplastics) and inherent vice.



Stéphanie Ovide is a textile conservator and researcher. She graduated both from the Fashion Institute of Technology in New York and the Université de Paris 1 with Master's in Textile Conservation. She founded a conservation studio in Paris in 2009, l'Atelier Ovide, and work with Parisian fashion archives and museums. During a residency at the French Academy in Rome, the Villa Medici between 2016 and 2017, she developed a conservation protocol to clean metallic embroideries on 15th century Italian velvets. She is currently completing her PhD in Science, Art, Research and Creation at the Ecole Nationale des Arts Décoratifs in Paris. Her dissertation explores the conservation challenges of Couture collections in the 21st century through the collections of the house Balenciaga.



Anita Quye is Professor of Heritage Science at the Kelvin Centre for Conservation and Cultural Heritage Research in History of Art, University of Glasgow, Scotland. Her research interests in synthetic plastics, fibres and dyes combine chemical analysis, art history, experimental reconstructions and technical industrial archives to investigate 'everyday' museum artefacts and textiles for interpretation and preservation. Anita's publications and collaborations including 'Plastics: collecting and conserving', Icon's Ethical Sampling Guidance and expert adviser to the Synthetic Garments Project (PHS and DATS, UK) and PlasCO2 (NOVA, Lisbon). She was a Getty scholar in 2022 and is currently writing a handbook of modern materials in popular decorative art and fashion history.

