THE INSTITUTE OF CONSERVATION

#Icon19

New Perspectives: Contemporary Conservation Thinking and Practice

Belfast
11-14 June 2019

ICC Belfast | Waterfront Hall
Courtesy Belfast Waterfront

New Perspectives: *Contemporary Conservation Thinking and Practice*

Belfast
11-14th June 2019

ICC Belfast | Waterfront Hall
Belfast, Northern Ireland

THE INSTITUTE OF CONSERVATION

Cover Image
SS Nomadic at Titanic Belfast. Titanic Quarter, Belfast, courtesy of Titanic Belfast.

Washing a Burne-Jones chalk drawing on the suction table.
Photo: Graeme Storey, Britton and Storey Conservation

Contents

Welcome by Chair of Icon's Board of Trustees

It is my particular pleasure to welcome you all to Belfast, my own home city, for the Icon 2019 triennial conference. Over our last four Icon conferences Icon has visited every region of the United Kingdom bringing our members and friends a platform to look at sectoral trends but also to appreciate the local cultural and conservation strengths.

Belfast is a city with a proud industrial heritage that is reinventing and rejuvenating itself despite the legacy of a troubled past. It therefore seems appropriate that the theme for our conference is New Perspectives.

The conference will be a celebration of contemporary research and practice and will offer opportunities to debate new developments in the profession and look at how we promote connectivity, sustainability and accessibility in practice.

Icon is a collective of different specialisms and the conference offers a broad diversity of speakers, sharing their perspectives with a focus on innovation and fresh insights. It will bring forward ideas on new technologies while dealing in novel ways with established challenges. The conference aims to stimulate and motivate not only our own profession but also reach out to our colleagues and the curious with an interest in the cultural heritage.

With so much emphasis on the new it is important that there are plenty of opportunities to make new connections; but also to reconnect with friends and colleagues and so this conference offers a great range of networking and just plain fun activities. I hope that you will also take some time to enjoy and celebrate the City and that, if you are a stranger to Belfast and Northern Ireland, that it will challenge your perceptions and leave you with same affection that I have for the city and its people.

So - whether you are a seasoned conservator, an allied professional or an interested individual I am sure that there is something to engage, inform and inspire but most of all I hope that you enjoy your experiences and the warmth of the Belfast welcome.

Siobhan Stevenson ACR
Chair of Icon's Board of Trustees

#Icon19 Welcome from the Chief Executive

It gives me great pleasure to welcome you to our fantastic #Icon19 conference: **New Perspectives: Contemporary Conservation Thinking and Practice.** Whether you are a regular attendee, or a newcomer like me, I am sure that you be delighted with the range and variety of the presentations on offer. The challenge, as always, will be deciding which of the parallel sessions to attend, but you can be certain that whatever you choose you will hear about the latest developments in conservation of cultural heritage from experts in their respective fields. We were genuinely overwhelmed by the number of submissions that we received; this is a wonderful endorsement of the breadth and scale of research projects that conservators, collections managers, heritage scientists and others are currently undertaking. I am very proud that this conference will showcase innovative thinking from across the conservation sector.

I am also extremely pleased that this triennial conference is closely aligned with two of Icon's values. We aim to be *forward-looking and outward-looking* so taking part in #Icon19 is a great way to ensure that we *keep our eyes on the horizon and on the world around us.* The conference also provides an excellent opportunity to be *collaborative and generous, as we work with our members to share learning and achieve the best results together.*

On this note I would encourage you to make the most of the many networking opportunities that are interwoven into the programme and the visits. Speaking personally, I recognise that I learn a huge amount from colleagues through the informal conservations that take place during refreshment breaks, so I very much look forward to meeting as many of you as possible during our time together in the glorious city of Belfast.

Sara Crofts
Icon Chief Executive

Welcome from Leanne Tonkin, Chair of the #Icon19 Programme Committee

I am very excited to be involved with #Icon19 Belfast. It is a real privilege to work with Icon and all groups and networks to pull together a great programme of talks and posters. My specialist area is contemporary fashion and textiles which involves many complex conservation issues, so it's great to see a surge of diverse projects being represented at the conference.

It was great #Icon19 received so many abstracts to review, it made the job very difficult but very rewarding. Congratulations to everyone who submitted, the range of abstracts is a real demonstration of the power of the conservation field and the vast and essential contribution everyone's work makes to many communities.

I am looking forward to meeting many of you and listening to some 'new perspectives' in conservation, whilst also sampling the local finery Belfast offers in victuals and libations!

Leanne Tonkin
Chair, #Icon19 Programme Committe

Cleaning one of the marble fireplaces at The Royal Pavilion, whilst on a West Dean College of Arts & Conservation MA student placement. Image: Michelle Kirk

Special Guest Speaker
Dr Meredith Wiggins
Historic England

#climateheritage

The historic environment provides one of humankind's most potent symbols of resilience. Landscapes that have been familiar to generations, monuments that stand the test of time and intangible values that bind communities are enduring perceptions of heritage. However, things are changing.

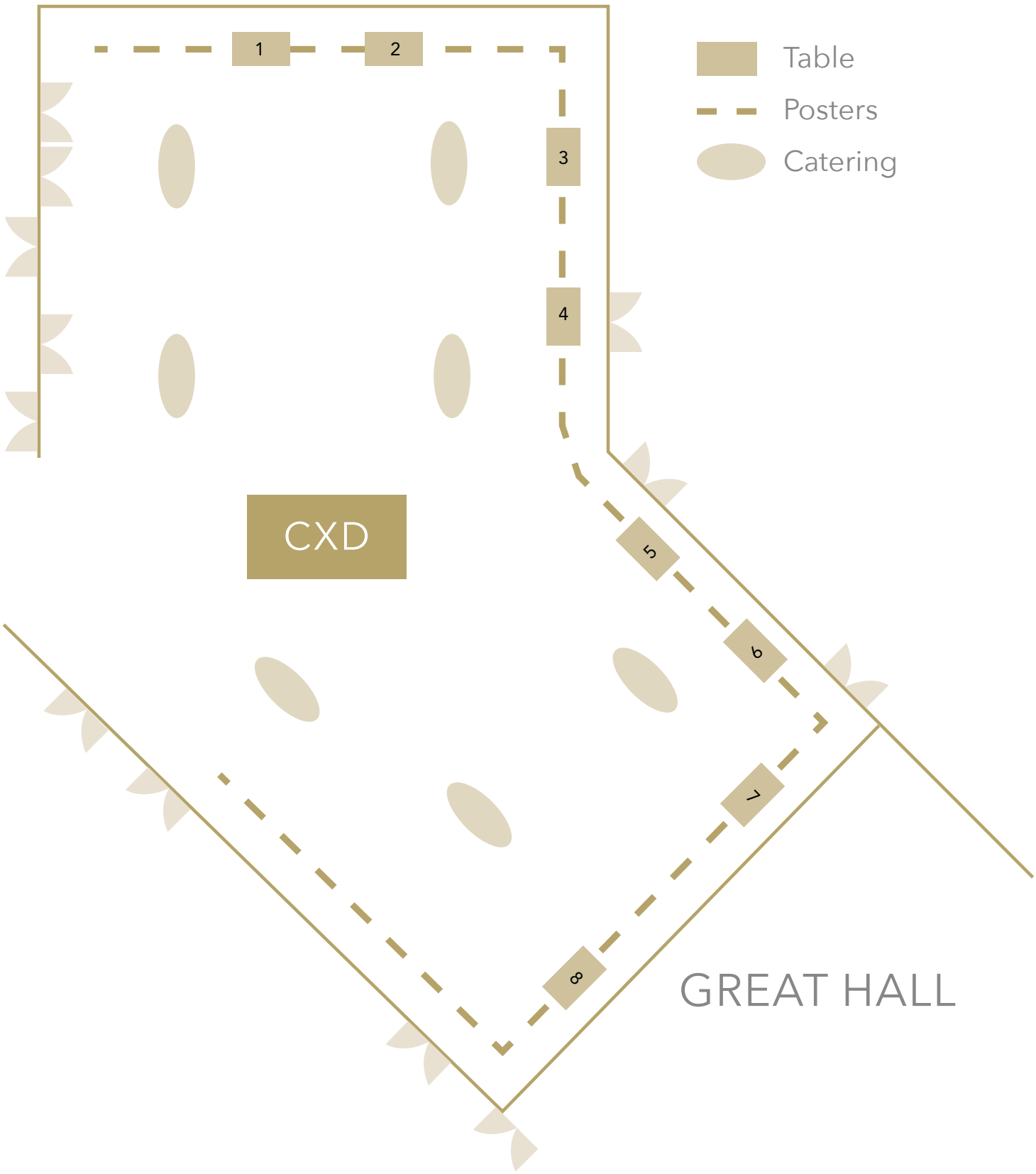
Climate change is affecting not only the landscapes, monuments and values we are trying to conserve; it is fundamentally altering what heritage is being preserved for future generations. Historic England, the UK Government's expert advisor on the historic environment has been working for more than a decade on trying to understand the risks and opportunities that climate change presents for heritage in England, but now our tactics are evolving. Rapid environmental changes need different approaches to conservation, and rising temperatures and sea levels require novel methods.

To that end, we've been working on cutting edge projects to help make decisions at the coast, integrate heritage into environmental thinking and use historic buildings to address worldwide carbon targets. More than that, we've banded together with colleagues all over the world to share best practice, support inevitable loss, and promote the role heritage can play in a sustainable future.

Dr Meredith Wiggins
Dr. Meredith Wiggins is Senior Environmental Analyst at Historic England, The UK Government's expert adviser on the historic environment. She works at the intersection of the natural and built environments and is particularly interested in climate change adaptation, risk and resilience, and sustainable development. Through commissioned project work, Meredith and her colleagues have explored how historic buildings can contribute to meeting carbon reduction targets, how heritage assets double as providers of ecosystem services and how on-going coastal changes will affect England's physical, cultural and intangible heritage. Meredith is also passionate about using social and environmental data to understand opportunities for and threats to the historic environment.

Attaching a Japanese guard to an item.
Image Arthur Green, Green's Books Ltd

Conference Floorplan



Trade Fair vendor information

1 Meaco Measurement and Control Ltd	We work with small independent museums to national institutions and because we concentrate on monitoring and control for collections this has given us a thorough understanding of your needs. Through listening to you, Meaco now offer the widest choice of environmental monitoring and control equipment available in one place – you can even buy on-line! But our commitment doesn't just end there; we are with you every step of the way with on-going support, maintenance and servicing of all your equipment. So if you have any questions regarding any aspect of environmental monitoring and control just ask your experts!	Lymedale Business Centre, Lymedale Business Park, Hooters Hall Road, Newcastle, Staffordshire, ST5 9QF Michael Hall 01782 565917 michael@meaco.co.uk
2 Tue Vue, Inc	Tru Vue anti-reflective acrylic and glass solutions, including Optium® Museum Acrylic and UltraVue® Laminated Glass, are trusted to protect and display fine art and cultural heritage across the globe. We work closely with the museum community to develop products that meet superior aesthetic and conservation standards.	9400 West 55th Street, McCook, IL 60525 USA Dr. Jennifer Booth, Business Manager Fine Art and Museums fineart@tru-vue.com https://tru-vue.com/ museums-collections/ 001 708 854 2700 Fax: 708.854.2660
3 International Institute for Conservation of Historic and Artistic Works (IIC)	IIC was founded in 1950 by a group of men and women who witnessed dramatic events during WW2 and they were involved in saving internationally important historic and artistic works from being lost forever - they became known as the Monuments Men. Today we have a strong global network of distinguished Fellows, members and Institutions representing more than 70 countries. We have close relationships with thousands of Conservators and heritage professionals internationally. IIC has over 7,000 engaged supporters and 40,000 social media contacts globally. We have long-established partnerships with leading museums, universities and heritage bodies all around the world.	3 Birdcage Walk, London, SW1H 9JJ, UK Graham Voce Executive Secretary iic@iiconservation.org www.iiconservation.org Tel: +44 (0)20 7799 5500 Fax: +44 (0)20 7799 4961
4 Centrado Trading Ltd	Centrado Trading are suppliers to the picture framing and art markets of the complete range of framing materials. We are exclusive stockists of Rising Museum mountboards which is the board of choice for museums across the globe including MOMA, The Getty and Guggenheum. Our product portfolio also includes the Artglass product range of anti-reflective and UV blocking glasses. The large variety of specifications and sizes coupled with industry leading quality standards means that over 70% of anti-reflective glass used in Europe is made by Artglass.	Unit 2 Stonehill, Huntingdon PE29 6ED William Middleton william.m@centrado.co https://centrado.co/ +44 (0)1480 445480

5 Taylor & Francis Group, an Informa business	Routledge is proud to publish *Journal of the Institute of Conservation,* the official journal of Icon. Visit our stand at #Icon19 to browse the latest research published in our journal and to find out how you can submit your own paper. We look forward to meeting you!	4 Park Square, Milton Park, Abingdon, Oxon OX14 4RN UK George Cooper George.Cooper@tandf.co.uk
6 Klug Conservation	KLUG-CONSERVATION manufactures archival materials for the preservation and conservation of cultural artefacts. Our paper and board products are made according to internationally recognised standards. We make the materials ourselves and are therefore able to guarantee archival quality. Standard or bespoke - archival paper, mounting board, boxboard, corrugated board and honeycomb panel are the basis for our vast range of products such as mounts, pockets, folders, enclosures, boxes or tubes. We also offer an electronic book measuring service and bespoke boxing service. At the ICON19 you can find out about our latest product innovations.	Martin House Sheep Street Stow on the Wold GL54 1AA Martin Stammberger www.klug-conservation.com mas@klug-conservation.co.uk +44 (0) 1451 509292 M +44 (0) 7523 980802
7 John Purcel Paper	John Purcell Paper are stockists of an extensive range of high specification archival papers and boards made on either cylinder mould or fourdrinier machines. Our mount boards include Heritage 100% Cotton Museum Board, both buffered and unbuffered. Included in the museum board range are very large sizes available from stock. We carry a number of conservation grade mount boards made from high quality woodpulp in a range of shades and thicknesses up to 3000 microns. We have many fully archival papers and laminated boards for other applications including boards for boxmaking, cover materials and backing papers. In addition we offer a range of Japanese papers and handmade western papers suitable for a variety of conservation and restoration uses.	15 Rumsey Road, London SW9 0TR, UK John Purcell / James Pimperton jpp@johnpurcell.net www.johnpurcell.net Tel 020 7737 5199 Fax 020 7737 6765

8 Icon Mentor - Meeting Point	A group of Icon's Mentors who are at Icon19 would be delighted to talk to you to help you reflect on your professional development or to discuss any questions you have which will help you on your route to accreditation. If you haven't already signed up, keep an eye out for Patrick Whife, Icon's Training and Development Manager, who will be able to help.	Patrick Whife
CXD Conservation By Design Limited	We are living through challenging times. Protecting our cultural heritage and the environment, whilst making sound commercial decisions are high on both our agendas. We all need to work together to make greater strides to achieve these aims. Being central at the Icon Conference Belfast 2019 gives us the best opportunity to be part of that important exchange. Please join us at lunch time on the top floor for "CXD's Paper Trail: A walk through the mill " film tour and be sure to come and visit us on the stand to pick up your free gift.	Timecare Works 2 Wolseley Road Kempston, Bedford MK42 7AD United Kingdom Sales and Samples info@cxdinternational.com www.cxdinternational.com +44 (0) 1234 846333

Delegate Offers

Belfast is famous for its hospitality, warm welcome and sense of fun. The city is packed with fascinating tours and attractions, luxurious shopping experiences, amazing eateries and great nightlife.

To help you make the most of your stay, Visit Belfast has put together a selection of exclusive offers and discounts – especially for you.

And all you need is your #Icon19 delegate badge!!

Simply present your #Icon19 delegate badge at any participating outlet.

Full details are available at https://meetbelfast.com/delegate-offers

Scan me

Special events

International Delegates Reception
Tuesday, 11th June 2019
7.30pm

SS Nomadic
Hamilton Dock, Queens Road
Titanic Quarter
Belfast BT3 9D

Coming from overseas, continental Europe or Asia? So are many others! Nearly 20% of Icon's membership is based abroad – and if previous conferences are anything to go by, if you're coming a long way to join us in Belfast you certainly won't be the only one.

Join us as we celebrate our long-haul delegates and make the most of Belfast with a chance to see the last surviving ship of the White Star Line – the historic tender SS Nomadic.

Built by Harland and Wolff, Belfast, in 1911, the Nomadic enjoyed a long career ferrying passengers from Cherbourg quayside to the famous ocean liners at anchor in the harbour, including the Titanic, Normandie, Queen Mary and Queen Elizabeth. Retiring in 1968, Nomadic spent many years as a floating restaurant moored on the Seine in Paris before a successful fundraising campaign brought the ship back to Belfast for a full conservation and restoration project in 2006.

Please join us for wine and canapés aboard the historic vessel, now in drydock at Titanic Belfast. Meet and mingle with fellow delegates and get into that #Icon19 spirit after your long journey!

Gala Conference Dinner
Thursday 13th June 2019
7.30pm

Belfast City Hall
Donegall Square North
Belfast, BT1 5GS

We're only gathered together across the spectrum every three years, so our formal Triennial Dinner is set to be a glamourous event not to be missed!

A sumptuous monument built to reflect the new 'city' status that had been granted by Queen Victoria, Belfast City Hall boasts an interior demonstrative of the highly-skilled craftsmen employed on its construction in 1906 – many of whom also worked to decorate the world-famous luxury liners produced by the Harland and Wolff shipyard nearby.

Delegates at #Icon19 will have the chance to experience this ornate Edwardian splendour for themselves, at our sit-down conference dinner featuring a three-course meal and a cash bar.

Time sparkle in your best galawear while you ascend the red-carpeted grand staircase to the Great Hall for dinner, an area usually off-limits to the public. It's a great opportunity to demonstrate the maturity of our profession – and to introduce any friends or family to your favourite colleagues and conference mates.

Delegates will also have the chance to explore the venue as part of Tuesday's conference tours programme with conservation architect Dawson Stelfox MBE, who will relate his experience working on restoration project that was completed in 2009.

A very special thanks to Belfast City Council for their kind generosity for the use of the City Hall and for welcoming us so warmly with a wine reception.

Opening Reception
Wednesday, 12th June 2019
7.30pm

Ulster Museum
Botanic Ct
Belfast BT9 5AB

A staple of our triennial conferences –
the grand opening reception!

With an institutional history stretching back to 1821, the present Ulster Museum building was built in 1929. Nearly 8,000 square meters of public display space is used to showcase collections of fine art, archaeology, local history, numismatics zoology and even treasures from the Spanish Armada.

With a sleek interior from a refurbishment completed in 2009, it's the perfect place to gather everyone together to formally launch #Icon19!

Come along to the Atrium at Ulster Museum in Belfast for a glass of wine, some canapés and a chance to meet some of the movers and shakers we have invited to join us. It's a great opportunity to see who else is about and make new connections to take you through the rest of the proceedings and beyond.

Don't forget to pre-book a cab for the short journey back to the city centre afterwards.

Special thanks to

Belfast City Council

Steam Jazz Night
Friday, 14th June 2019
7.00pm

Beflast Lanyon Place Station
47 East Bridge Street
Belfast BT1 3DB

After the crescendo from our final plenary sessions has subsided, it's time to relax and have fun!

But we've all been to conferences where all that energy briskly evaporates after the final speaker – and often, chances to consolidate your networking evaporate too!

Feedback from our last conference, Turn and Face the Change in Birmingham 2016, indicated that our delegates place a high value on ever-more chances to network, meet new colleagues and keep up with friends – and so this year's triennial conference in Belfast sees the addition of a brand-new feature into the programme to do just that!

After the final plenary sessions, we'll be unwinding in style aboard a vintage steam locomotive for a mighty chug along the local railway network. We'll be leaving the city behind and taking in Belfast and the vicinity with a cash bar and jazz band to keep us amused en route. At regular intervals, the train will stop to give us the chance to stretch our legs on the platform– and dance!

It's a great way to end our 2019 triennial international conference and gently make the transition from the confrerence wonderworld back to real life.

Gates Sofer removing wax layers from
Barbara Hepworth's Four-Square (Walk Through)

1. Conservation in Belfast City Centre
Wednesday 12th June 2019
1.30pm

Meeting Point:
Belfast City Hall
Donegall Square
Belfast BT1 5GS

A tour in two parts!

Walking Tour
Using four iconic Belfast buildings, this walking tour examines the development of the city from Elizabethan times up to the modernist masterplans of the 1960s, touching briefly on the effects of the Troubles on the shape of the contemporary city, before speculating on the city's future direction.

Walking tour leader **Dr Andrew Molloy** has over ten years of experience in the field of Architecture. In 2018 he completed his Doctorate in Architecture at Ulster University, examining the development of twentieth-century Belfast and the impact this has had on the city's heritage. He regularly leads walking tours for PLACE, the Built Environment Centre for Northern Ireland.

Inside and around Belfast City Hall
Noted Belfast architect **Dawson Stelfox MBE** will lead delegates on a tour of Belfast City Hall, taking in its sumptuous interior along with its exterior, grounds and monuments. The tour will focus on the venue's spectacular historic interior and the conservation project. Dawson was a key figure in the conservation project and will share his experience with the group.

Dawson is an architect and Belfast local. He is Chair of Consarc Design Group and in May 2008 he was elected President of the Royal Society of Ulster Architects. Among the many projects on which he has worked are Parliament Buildings, Stormont; Belfast's Christ Church; the Odyssey Arena; and the conservation of Belfast City Hall.

2. Street Art in Belfast
Wednesday 12th June 2019
10.00am

Meeting Point:
Albert Memorial Clock
17 Queens Square
Belfast BT1 3FF

Join Icon member and Belfast local **Ruth Bothwell** of Decowell Restoration & Deocration for a comprehensive look at the famous political street art in Belfast.

Delegates will experience the variety of local elements that require acknowledgement, care and in some cases conservation; applying fresh logical thinking and conservation practise. No better place than Belfast, a paramount city for history, growth, change and hope!

The tour includes:

- East Belfast: discussing the political and new murals - depiction, style, form and colour
- Crossing the peace line into West Belfast: discussing the political and new murals - depiction, style, form and colour etc.
- Back into the Cathedral Quarter to view and discuss New Sanctioned Murals.
- Finishing up at the historic Duke of York pub for questions and answers.

Lunch is included in the cost of the tour.

Top Left: Belfast City Hall. *Top Right*: Inside Belfast City Hall. *Bottom:* A street mural in Belfast.

3. A Day at Mount Stewart
Wednesday 12th June 2019
10.00am

Meeting Point:
The Crown Bar
46 Great Victoria St
Belfast BT2 7BA

The Londonderry's family home reopened its doors in April 2015 following a three year £8 million restoration programme. Come and see how this transformation has changed the house – and speak with the conservators and specialist advisors involved.

A free-flow day taking a relaxed approach to knowledge sharing, with talks from curator **Frances Bailey,** conservator **Claire Magill ACR,** and **Katy Lithgow ACR,** National Trust Head Conservator. There will be plenty of time to explore the house at your own pace, or join a guided tour.

Please note lunch is not included, so feel free to pop to the café whenever you like.

4. A Day at Hillsborough Castle
Wednesday 12th June 2019
10.00am

Meeting Point:
Belfast City Hall
Donegall Square
Belfat BT1 5GS

In 2014, Historic Royal Palaces took over the running of Hillsborough Castle and began an ambitious project to restore the house and gardens to its former glory. The project completed in April 2019 with a brand new visitor centre, restaurant, café, gift shops and, of course, 300 space car park.

Constructed circa 1788 as a family home of the Hill family, Marquises of Downshire, Hillsborough Castle officially became the Royal residence of Northern Ireland in the 1920s and since the 1970s has been home to the Secretaries of State for Northern Ireland. It has witnessed many important events, several of which have contributed to peace in Northern Ireland and the country's emergence as a significant tourist destination. Guests to Hillsborough Castle literally walk in the footsteps of president and princesses.

On this visit, there will be an opportunity to choose from a selection of tours, specifically set out below:

- **Castle Tour:** Tour through the State Rooms of the castle, listening to its history and learning about the important events that took place, shaping Northern Ireland's history.
- **Conservation tour:** Listen to how the castle was represented and conservation introduced by Historic Royal Palaces, to care for the precious collection that is held within the building. This will also include a tour of the newly built conservation facility.
- **Garden Tour:** Be guided though the gardens and learn about the design, history and special breeds of plants, which are located here.
- **Town Tour:** Learn about the history of the village, built and improved by the Hills Family, including the 17th Century Fort and late eighteenth century Market and Courthouse.

Lunch which can be purchased from a venue of your choice at the Castle or in the surrounding village.

5. Exploring National Museums Northern Ireland (NMNI)

Wednesday, 12th June 2019
10.00am

Meeting Point:
Belfast Waterfront
2 Lanyon Place
Belfast BT1 3WH

The National Museum Northern Ireland holds diverse collections across four museum sites. This tour provides an insight into aspects of the collections at Ulster Folk Museum, Ulster Transport Museum and the Museums Main Off-Site Store.

The Ulster Folk and Transport Museum occupies an extensive 180 acre site just outside Belfast. The tour will cover how collections are cared for in the Ulster Folk Museum which includes a range of exhibit buildings that immerse visitors in Ulster life at the turn of the century. A tour of the neighbouring Transport Museum will address some of the key issues in caring for large collections and an opportunity to see how the "Take Care" project seeks to balance access and care issues for collections on open display. The Main Off-Site Store holds the majority of the Ulster Museum reserve collections and offers an opportunity to see behind the scenes at the collections and conservation facilities.

Participants are asked to dress for the outdoors and to wear good walking shoes as vehicular access is restricted to the UFTM sites.

Conference Day 1 – Thursday 13th June

Time	Session	Venue
08.30 – 09.10	**Registration, Trade Fair, Posters, Coffee**	**Exhibition Hall**
09.10 – 11.30	**Plenary Session 1 – Chair: Vanessa Applebaum**	**Great Hall**
09.10 – 09.15	Welcome and Introductions: Siobhan Stevenson ACR, Chair of the Board of Trustees	
09.15 – 09.20	Conservaton By Design – Caroline Checkley-Scott	
09.20 – 09.40	Address by invited VIP - Paul Mullan, Director Northern Ireland, National Lottery Heritage Fund	
09.40 – 10.40	Keynote: Dr Eleanor Schofield – Where the arts meet science: Keeping the Mary Rose ship-shape!	
10.40 – 11.00	Sustainability and the Future of Collections – Sandra Smith	
11.00 – 11.20	Approaches to cleaning modern and contemporary art collaborations, methodologies and novel materials – Bronwyn Ormsby	
11.20 – 11.30	**Questions**	
11.25 – 11.55	**Trade Fair, Posters, Coffee**	**Exhibition Hall**
	Mobile Heritage Lab: **Demonstration: Testing the Oddy Test – Aditi Nagar**	**Outside**
11.55 – 13.20	**Plenary Session 2 – Chair: Eleanor Schofield**	**Great Hall**
11.55 – 12.15	E-RIHS: Driving New Practices and Collaboration in Conservation and Heritage Science – Matija Strlic	
12.15 – 12.35	Conservation in a Conflict Zone: Assessing War-Damaged Paintings at the National Gallery of Afghanistan Richard Mulholland, Elsa Guerreiro	
12.35 – 12.55	The Engineering Past, and Future, of Brunel's SS Great Britain Nicola Grahamslaw	
13.00 – 13.20	**Questions**	
13.20 – 14.20	**Lunch, Trade Fair, Posters,** **Demonstrations and Breakout sessions**	**Exhibition Hall**
	Mobile Heritage Lab: Demonstration: Machine learning to visualise historic artefacts Gavin Leong	**Outside**
	Breakout session: Emerging Professionals Network Panel Discussion Libby Ireland, Alyssa Singh, Charlotte Tomlin, Sarah Peek, Sarah Morton	**Meeting Room 1a**
	Breakout session: PACR Drop In – Patrick Whife, Icon Training and Development Manager	**Meeting Room 2a**
	Breakout session: Conservation By Design - Premiere screening of the film "CXD Paper Trail: A Walk Through the Mill	**Meeting Room 3a**
14.20 – 15.40	**Seven Parallel Group Sessions**	
	Book and Paper 1 **Chair: Mark Furness**	
14.20 – 14.40	Testing storage materials for paper based archives Paul Lankester	**Great Hall**
14.40 – 15.00	Applications of anodized aluminum extrusions in book conservation. Alessandro Scola	
15.00 – 15.20	Woven fabrics in book conservation: an investigation into the properties of aerolinen and aerocotton Nikki Tomkins	
15.20 – 15.40	**Questions**	

Collections Care 1
Chair: Jane Tompson Webb ACR

14.20 – 14.40	Preventive conservation redefined: the historic housekeeping perspective Katy Lithgow ACR, Helen Lloyd ACR	**Meeting Room 2a**
14.40 – 15.00	Reassessing Assumptions - Tailoring Preventive Conservation to Collection Needs. Karen Bradford	
15.00 – 15.20	Hillsborough Castle: Opening doors, exploring stories, inspiring the future for everyone. David Orr ACR	
15.20 – 15.40	**Questions**	

Dynamic Objects
Chair: Kenneth Cobb

14.20 – 14.40	A New Code of Practice for Turret Clocks Janet Berry ACR	**Meeting Room 1b**
14.40 – 15.00	Cybernetic Umbrella: A Case Study of Kinetic Art Conservation at Tate Carla Flack ACR	
15.00 – 15.20	Bringing Nancy Astor's electric canoe back to life: the restoration of Liddesdale at Cliveden Vicki Marsland ACR	
15.20 – 15.40	**Questions**	

Leadership and Strategic Thinking
Chair: Simon Cane ACR

14.20 – 14.40	Conservation narratives and the power of language Hannah Clare ACR	**Meeting Room 1a**
14.40 – 15.00	Conservation Leadership Amber Xavier-Rowe ACR	
15.00 – 15.20	Conserving the Conservator: how leadership skills can help to overcome challenges and barriers to progression Julie Bon ACR	
15.20 – 15.40	**Questions**	

Paintings
Chair: Annette King ACR

14.20 – 14.40	Radical Paint: Acrylics in the Swinging Sixties Patricia Smithen ACR	**Meeting Room 3a**
14.40 – 15.00	The atypical restoration of a painting wounded by war: the case of Migette' "Graoully" - Airbrush non-illusionistic painting conservation treatment Carole Clairon-Labarthe	
15.00 – 15.20	Reflections on surface changes in the paintings of Gary Hume Helen Brett ACR	
15.20 – 15.40	**Questions**	

Sustainable Thinking
Chair: Sandra Smith ACR

14.20 – 14.40	The adaptive re-use of buildings: realising the conservation that we all (can) live in. Graham Voce, Adam Klups	**Meeting Room 2b**
14.40 – 15.00	Taking responsibility for the past: Conservators role in the care of contested heritage' Pia Edqvist	
15.00 – 15.20	Sustainability in Conservation: Material Use and Sustainability Caitlin Southwick	
15.20 – 15.40	**Questions**	

Textiles 1
Chair: Janie Lightfoot ACR

14.20 – 14.40	Taking the Strain: Using Digital Image Correlation to monitor strain in tapestries displayed on slanted supports Frances Lennard ACR	**Meeting Room 3b**
14.40 – 15.00	A low tech approach to high tech analysis Hannah Sutherland	
15.00 – 15.20	Collections made of fragments: Samples of Pre-Columbian textiles Elizabeth Palacios	
15.20 – 15.40	**Questions**	
15.40 – 16.10	**Break** **Trade Fair, Posters, Coffee**	
	Mobile Heritage Lab: Demonstration: Participatory research using the Mobile Heritage Science Lab Josep Grau	**Outside**
	Demonstration: Practical poster session Chair: Victoria Stevens ACR	**Meeting Room 1a**

Book and Paper 2
Chair: Shona Hunter

16.10 – 16.30	Conserving the Scottish Session papers for digitisation Nicole Devereux	**Great Hall**
16.30 – 16.50	Rebinding the Ruzbihan Quran: contemporary considerations for the conservation of bound Islamic manuscript material Kristine Rose-Beers ACR	
16.50 – 17.10	The First Act: Preparing the Parliamentary Archives for a Future Move Kirstin Norwood, Rhiannon Compton	
17.10 – 17.30	**Questions**	

Collections Care 2
Chair: Karen Bradford

16.10 – 16.30	The Toil and Trouble of the Anoxic Bubble: Pest Eradication Consternation Bethany Skuce, Sarah Bashir	**Meeting Room 2a**
16.30 – 16.50	Turning up the Heat: A user review of heat treatment to eradicate Death Watch Beetle (Xestobium rufovillosum) Robert Entwistle ACR	
16.50 – 17.10	Advancing management practices for storage of archaeological metals Johanna Thunberg, Nicola Emmerson, David Watkinson	
17.10 – 17.30	**Questions**	

Heritage Science 1
Chair: Sarah Hunt

16.10 – 16.30	Maximal Intervention: Extreme solutions to vinegar syndrome David Mills	**Meeting Room 2b**
16.30 – 16.50	The development of magnetic nanocomposites for the removal of destructive acids from marine archaeological wood Eleanor Scholfield	
16.50 – 17.10	Hydrofluorocarbon Solvents: Novel Material Applications for Cleaning and Acrylic Solvation Michael Doutre	
17.10 – 17.30	**Questions**	

Leadership and Advocacy 2
Chair: Sara Crofts

16.10 – 16.30	Are we getting the right message across? An evaluation of contemporary practices in public engagement Isobel Griffin ACR	**Meeting Room 1a**
16.30 – 16.50	Exploring a Multicultural Education Model to Enhance Conservation Education Melissa Tedone, Adam Foley	
16.50 – 17.10	**Questions**	
17.10 – 17.30	Open Discussion on Leadership and Adovcacy *Chaired by Sara Crofts*	

Modern Materials
Chair: Adriana Francescutto Miró

16.10 – 16.30	Preserving biodegradable plastic masks at the Science Museum Vanessa Applebaum	**Meeting Room 1b**
16.30 – 16.50	Assessment and Treatment of Electrical Circuits in a 1930's Model Hospital for The Science Museum, London Kenneth Cobb	
16.50 – 17.10	Ephemerality, values and new models: an approach to Graffiti and Street Art Conservation Rita L. Amor Garcia	
17.10 – 17.30	**Questions**	

Paintings 2
Chair: Julia Nagle ACR

16.10 – 16.30	Conservation of Russian Abstract art of the second part of the 20th century. Accepting the challenges Anastasia Yurovetskaya	**Meeting Room 3a**
16.30 – 16.50	Synthetic Organic Pigments in Talens artist oil paints The Fanal pigments Rika Pause	
16.50 – 17.10	Study of Indoor Spray Paints on Canvas within French Museums Emilie Faust	
17.10 – 17.30	**Questions**	

Textiles 2
Chair: Frances Lennard ACR

16.10 – 16.30	Illuminating the Ancient Process of Light Bleaching of Textiles Caitlyn Picard	**Meeting Room 3b**
16.30 – 16.50	Behind the Unpredictable Response of Indigo Carmine Dyes in Aqueous Environments Laura Garcia Vedrenne	
16.50 – 17.10	All Shot Up? Ballistic and Technical Investigation into early 20th century Irish Flags Rachel Phelan	
17.10 – 17.30	**Questions**	

Conference Day 2 – Friday 14th June

Time	Session	Venue
08.45 – 09.30	Registration, Trade Fair, Posters, Coffee	Exhibition Hall
09.30 – 10.50	**Seven Parallel Group Sessions**	
	Collections Care 3 **Chair: Sarah Hamlyn ACR**	
09.30 – 09.50	Developing and applying contemporary conservation practice to British Library on Demand Emily Watts	**Meeting Room 2a**
09.50 – 10.10	One Collection: Harnessing digital technology for collections moves Emily Yates	
10.10 – 10.30	Have you got this one? The development of a web-based insect pest recording database Jane Thompson Webb ACR	
10.30 – 10.50	**Questions**	
	Contemporary Art **Chair: Louise Lawson**	
09.30 – 09.50	Zombification? Retaining 'Live' when documenting and conserving Performance Art at Tate Ana Ribeiro	**Meeting Room 1b**
09.50 – 10.10	To perform or not to perform: Mary Kelly's 'An Earthwork Performed' Helia Marcal and Duncan Harvey	
10.10 – 10.30	Instantiation, Actualisation, and Absence: Enacting and Conserving Katie Paterson's "Future Library" Brian Castriota	
10.30 – 10.50	**Questions**	
	Having It Large 1 **Chair: Keith Scobie-Youngs ACR**	
09.30 – 09.50	Current approaches to the practical repair of the external terracotta of the Natural History Museum Angus Lawrence ACR	**Meeting Room 1a**
09.50 – 10.10	Architectural Conservation Projects and their Stories Maniyarasan Rajendran	
10.10 – 10.30	Conservation treatment of Daniel Maclise's Royal Gallery wall paintings: Collaborative research informing approach Rebecca Tehrani, Elizabeth Woolley ACR, Richard Lithgow	
10.30 – 10.50	**Questions**	
	Heritage Science 2 **Chair: Eleanor Schofield**	
09.30 – 09.50	Creating constructive pathways to aid ethical sampling decisions in scientific research for cultural heritage Anita Quye	**Meeting Room 2b**
09.50 – 10.10	Integrating and Visualizing Heritage Collection and Reference Sample Data Fenella France	
10.10 – 10.30	Research, Imaging and Interpretation in the Heritage Sector Chris Pickup	
10.30 – 10.50	**Questions**	

New Conservator 1
Chair: Jane Henderson ACR

09.30 – 09.50	The twenty-first century conservator: training, skills and employment Christina Rozeik ACR	**Meeting Room 3b**
09.50 – 10.10	Addressing the Needs of the Conservation Profession - The Evolution of Internships at the British Library Cordelia Rogerson	
10.10 – 10.30	HMS Caroline: staying afloat Diana Davis	
10.30 – 10.50	**Questions**	

Photographic Materials 1
Chair: Jacqueline Moon ACR

09.30 – 09.50	Proud to Be Protective Parents: A Case Study of Safe display of Calotype Negatives in Tokyo Saya Miles, Jenny Harvey	**Great Hall**
09.50 – 10.10	Investigation and conservation of the Ernest J. Bellocq glass plate negative collection Elsa Thyss	
10.10 – 10.30	What to do with thousands of degrading negatives Jordan Megyery	
10.30 – 10.50	**Questions**	

Stone and Wall Paintings
Chair: Peter Martindale ACR

09.30 – 09.50	Scraping for progress: the juxtaposition of progression and practice in Architectural Paint Research Rosie Shaw	**Meeting Room 3a**
09.50 – 10.10	Bellweathered; Reigate Stone at the Bell Tower, Tower of London Martin Michette	
10.10 – 10.30	New formulations for strappo detachment in contemporary murals Rita L. Amor Garcia	
10.30 – 10.50	**Questions**	
10.50 – 11.20	**Break** **Trade Fair, Posters, Coffee**	
	Mobile Heritage Lab: Demonstration: Testing the Oddy Test Aditi Nagar	**Outside**
	Break out session: Meet the Scotland Group!	**Boardroom**

11.20 – 12.40	Seven Parallel Group Sessions	
	Contemporary Art 2 **Chair: Deborah Cane ACR**	
11.20 – 11.40	Uncovering Robert Rauschenberg's Fossil for Bob Morris, 1965 Vincent Dion	**Meeting Room 1b**
11.40 – 12.00	The Conservation Project that Ushered a Pivital, yet Neglected, Female Artist into the Museum Spotlight Samantha Sheesley	
12.00 – 12.20	Using Photogrammetry in Outdoor Sculpture Conservation: Assessing Jean Dubuffet's Jardin d'email Alice Watkins	
12.20 – 12.40	**Questions**	
	Documentation **Chair: Siobhan Stevenson ACR**	
11.20 – 11.40	A workflow for publishing Linked Data for conservation documentation. A case study from Oxford Museums and Libraries Athanasios Velios	**Meeting Room 3a**
11.40 – 12.00	Connecting the Dots - Part 1: Mapping Conservation Documentation Using Knowledge Graphs Ana Tam	
12.00 – 12.20	Smartsourced Conservation: Overcoming the Limitations of Smartphone Technologies Laura Chaillie	
12.20 – 12.40	**Questions**	
	Ethnography **Chair: Charlotte Ridley**	
11.20 – 11.40	Conserving World Cultures for Medicine Galleries Adriana Francescutto Miro, Marisa Kalvins	**Meeting Room 2a**
11.40 – 12.00	Conservation of Uvol headdresses, the Horniman Museum and Gardens Misa Tamura ACR	
12.00 – 12.20	Conservation Challenges when Conserving the Ephemeral: The Conservation of a 7'Rambaramp Mortuary Statue, from Vanuatu circa 1920's for the Museum of Archaeology and Anthropology Cambridge University. Karen Horton	
12.20 – 12.40	**Questions**	
	Having It Large 2 **Chair: Brian Hall ACR**	
11.20 – 11.40	Armed for Success: A new strategy for English Heritage's Artillery Collection Bethan Stanley ACR	**Meeting Room 1a**
11.40 – 12.00	Blue light laser scanning for documenting surface alteration in medieval sculpture Christopher Weeks ACR	
12.00 – 12.20	Value and risk in the running of historic military tanks Luca Hoare	
12.20 – 12.40	**Questions**	

Heritage Science 3
Chair: Eleanor Schofield

11.20 – 11.40	Spectroscopic Studies of Organic Artefacts from the Mary Rose Lianne Jordan	**Meeting Room 2b**
11.40 – 12.00	Simulation modelling: A learning laboratory for preservation management support Cristina Duran Casablancas	
12.00 – 12.20	Searching for Rock Art at Stonehenge using Artificial Intelligence Gavin Leong	
12.20 – 12.40	**Questions**	

Historic Interiors
Chair: Rosie Shaw

11.20 – 11.40	Banqueting House: How do you monitor a monumental ceiling like Rubens? Jonathan Bridal ACR, Victoria Richards	**Great Hall**
11.40 – 12.00	Authenticity - the pursuit of shifting sands: the development of thinking on colour matching over the last 20 years Helen Hughes ACR	
12.00 – 12.20	A new way of looking! How architectural paint analysis contributes to a new methodology for material culture research. Meredith Freeman	
12.20 – 12.40	**Questions**	

New Conservator 2
Chair: Julia Jablonska

11.20 – 11.40	A nudge in the right direction: effective training for the time poor Sarah Hamlyn ACR, Nicole Monjeau	**Meeting Room 3b**
11.40 – 12.00	SWANS: Developing Partnerships and Cascading Expertise in a Challenging Environment Helena Jaeschke ACR	
12.00 – 12.20	Podcasting Conservators: The story so far Kloe Rumsey, Jenny Mathiasson	
12.20 – 12.40	**Questions**	

12.40 – 13.40	**Lunch, Trade Fair, Posters, Demonstrations and Breakout sessions**	**Exhibition Hall**
	Mobile Heritage Lab: Demonstration: Machine learning to visualise historic artefacts Gavin Leong	**Outside**
	Breakout session: Leadership Skills for Conservators Julie Bon ACR, Claire Magill ACR and Bridget Mitchell	**Meeting Room 1a**
	Breakout session: PACR Drop In – Patrick Whife, Icon Training and Development Manager	**Meeting Room 2a**
	Breakout session: Intern Lunch	**Meeting Room 3a**

13.40 – 15.00	**Plenary Session 3 – Chair: Siobhan Stevenson ACR**	**Great Hall**
13.40 – 14.00	Shining a light on the emerging conservator: Challenges facing the future generation. Arianne Panton and Rebecca Plumbe	
14.00 – 14.20	Forging ways forward through the fear factor Leanne Tonkin	
14.20 – 14.40	Who do we exclude when we keep things for the future? Jane Henderson ACR	
14.40 – 15.00	**Questions**	
15.00 – 15.30	**Break** **Trade Fair, Posters, Coffee**	**Exhibition Hall**
	Mobile Heritage Lab: Demonstration: Participatory research using the Mobile Heritage Science Lab Josep Grau	**Outside**
15.30 – 17.30	**Plenary Session 4 – Chair: David Leigh ACR**	**Great Hall**
15.30 – 15.50	Conservation for mission: an evaluation of the Church of England's conservation grants programmes Janet Berry ACR	
15.50 – 16.10	Matching Practice with Purpose: Challenges of conservation within a diverse collection Siobhan Stevenson ACR	
16.10 – 16.30	Eight Days a Week: Lessons Learned Worldwide in Public Outreach, Advocacy, Partnerships, and Fundraising Debra Hess Norris	
16.30 – 16.45	**Questions**	
16.45 – 17.10	**Closing Keynote** - #climateheritage Meredith Wiggins	**Great Hall**
17.10 – 17.30	**Conference Round Up & Discussion** Jane Thompson Webb ACR	**Great Hall**

Peace Walls, Belfast
Image: VisitBelfast

Conference Sessions
Day 1 – Thursday 13th June 2019

Plenary Session 1
Great Hall, 09.10-11.30
Chair: Vanessa Applebaum

Sustainability and the Future of Collections

Sandra Smith ACR

Sustainability, particularly as it relates to the textiles industry and plastics is causing a revolution in manufacturing methods and use of new technologies which will challenge the perceptions, longevity and understanding of museum collections. The global uproar against non-degradable plastics, which now infiltrate both food-chains and the environment, is the impetus for industry to find truly biodegradable material. It is likely that clothes, household goods, furniture etc which are partially or wholly based on plastics will be designed with short lifetimes; water bottles, for example, are already manufactured to degrade completely within a matter of months. When such items are seen as iconic representations of 21st century culture, there will be pressure on museums to preserve them. Innovative technologies create materials and objects which, though visually similar, are not based on traditional craft-based manufacturing methodology; dyes can be created and duplicated in microbes which simultaneously act as a mordant when heated; 3D printed metals have a different metallurgic structure to those created by traditional heating and annealing processes, fibres simulating spider silk are produced from yeast and sugars. The latter are more sustainable alternatives to oil-based, resource heavy, and environmentally damaging traditional industrially manufactured textiles. This paper will explore the future challenges in preserving sustainable materials. It will challenge the perceptions of 'craft' and suggest new skills that conservators will need to understand, document, interpret and display 21st Century sustainable materials.

Approaches to cleaning modern and contemporary art collaborations, methodologies and novel materials

Bronwyn Ormsby

Co-authors: Melinda H Keefe, Piero Baglioni, Angelica Bartoletti, Judith Lee

Over the past ten years, Tate has been a partner in a range of practice-lead and practice-based collaborative research projects designed to identify, refine, evaluate and where appropriate, employ cleaning methods for the removal of unwanted deposited soil from modern and contemporary art surfaces. After the completion of two international projects, NANORESTART and the Cleaning of Modern Oil Paints (CMOP) - in addition to the ongoing Tate-Dow Chemical Company-Getty Conservation Institute (Tate-Dow-GCI) partnership, this largely science-driven collaborative research has begun to produce tailored, evaluated, low risk systems for painted surfaces which offer conservators enhanced tools and approaches for cleaning sensitive surfaces, where aesthetic properties may be both subtle and vital. A range of surfactants, water-in-oil microemulsions and nanotechnology-based gels are now proving useful for both acrylic dispersion and oil-based painted surfaces; with direct applicability to other modern and contemporary materials, and conservation challenges. The methodology developed to ensure the research remains relevant to conservation practice encompassed several interdependent strands including: scientific understanding of the properties of art materials, design and amendment of cleaning systems based on the requirements of paint types and works of art, investigations into the effects of cleaning systems on test samples, residue studies, and case study treatments on works of art. This paper summarises key achievements, presents ongoing and future work, and explores the applicability of these materials to wider conservation practice.

Plenary Session 2
Great Hall, 11.55 – 13.20
Chair: Dr Eleanor Schofield

E-RIHS: Driving New Practices and Collaboration in Conservation and Heritage Science

Matija Strlic
Co-authors: Natalie Brown, Carl Heron, Marika Spring, Barney Sloane, Aurelie Turmel, Chris Gaffney, Robert McGreevy, Giannantonio Cibin, Jane Delve, David Watkinson, Derek Hamilton, Julian Richards, Magdalena Buchczyk, May Cassar

Reduced public sector resources and intense competition for funding mean that, increasingly, valid conservation projects cannot happen, and sharing of resources and facilities is a necessity. The European Research Infrastructure for Heritage Science (E-RIHS) with its UK hub aim to address this by strengthening and broadening the scope of and access to scientific investigation of heritage, in order to help conservation research and practices. Our vision is to transform current research frameworks by delivering integrated access to expertise, data and technologies, and to integrate world-leading UK and European resources to foster a culture of exchange and equitable cooperation between disciplines (experimental and digital sciences, conservation, humanities). E-RIHS practices will drive development and collaboration through facility platforms and support mechanisms that are accessible to conservators and conservation professionals: including access to archives, mobile and fixed laboratory facilities and digital tools (http://www.e-rihs.eu/access/). -tE-RIHS Academy: providing interdisciplinary training and leadership skills in conservation and heritage science. -tA research infrastructure that is a sustainable and strategic partnership that drive new conservation research opportunities. -tIncreased connectivity by facilitating collaboration between conservation practitioners, heritage researchers and the heritage industry as well as increased conservation awareness in the wider public and business sectors. Currently in its preparatory phase, E-RIHS and its UK hub aim to become standalone research infrastructures by 2022. At present there are 100 heritage intuitions and facilities involved spread over 16 countries, while 24 partners take part in the UK hub. Icon is formally involved through the NHSF.

Conservation in a Conflict Zone: Assessing War-Damaged Paintings at the National Gallery of Afghanistan

Richard Mulholland, Elsa Guerreiro

The heartbreaking destruction of monuments and antiquities at Nimrud, Bamiyan, Palmyra and many other sites has drawn worldwide attention to the loss of cultural heritage in conflict zones. The paintings collection at the National Gallery of Afghanistan has suffered some of the most extreme loss and damage ever witnessed in a national collection. Over the last twenty years, conflict, looting and intentional destruction has resulted in the loss of almost all of Afghanistan's national art collection. In 2018, as part of a collaborative project funded by the British Council's Cultural Protection Fund, and the Department for Digital, Culture, Media and Sport in the UK, the speakers travelled to Kabul to assess damaged paintings and works on paper at the National Gallery and determine what could be saved. Working closely with an Afghan NGO, a Canadian consulting company, and the Ministry of Culture and Information in Afghanistan, they also advised on developing storage and display facilities at the Gallery and on the training needs of the staff. This presentation will discuss the particular challenges of developing an international project to promote the conservation and preservation of collections in a conflict zone. It will also discuss the urgency to provide basic conservation skills and knowledge in Afghanistan, and how the project aims to provide entry routes for Afghani museum professionals into the field. Ultimately, the presentation will provide a platform for discussing the need for protecting both tangible and intangible cultural heritage in areas where they are most at risk.

The Engineering Past, and Future, of Brunel's SS Great Britain

Nicola Grahamslaw

Brunel's SS Great Britain was the world's first iron-hulled ocean-going vessel and an innovative feat of Victorian engineering. This paper explores the role of engineering throughout the life of this unique object, and how the ship's innovative conservation is becoming part of her engineering story. Salvaged from the Falkland Islands in 1970, the ship was brought back to her original Bristol dry dock, creating a site of international importance. She was cared for by engineers much as a working vessel would be, but corrosion, accelerated by chlorides in the wrought iron structure, meant that without intervention the ship would soon become structurally unsafe. In 1997, the ship's first professional curator was appointed. Research at Cardiff University determined that at 20% relative humidity corrosion could be controlled, and in a £15 million HLF-funded project, the first of its kind in the world, the dry dock and ship's interior were converted into a climate-controlled envelope to preserve the hull while allowing visitor access. By 'slowing down time' in this way, the multi-disciplinary conservation and engineering project extended the life of the ship to more than 100 years. With the Trust's attention now turning to the next 100 years a new post, the Ship's Conservation Engineer, has been created. A new specialism is being developed, combining the Trust's conservation philosophy with the principles and tools from a variety of engineering disciplines. The Ship's Conservation Engineer is leading this collaboration between the two fields, to secure the longer-term future of the SS Great Britain.

Book and Paper1
Great Hall, 14.20 – 15.40
Chair: Mark Furness

Testing storage materials for paper based archives

Paul Lankester
Co-authors: David Thickett

The preservation target for archive is often centuries, if not millennia. Small improvements to the storage environment can have a significant impact on the lifetime of the collection. A number of factors can impact on the lifetime; here the focus is on the storage material itself. The materials documents are stored in can cause damage. Recent research has indicated pollution levels in microclimates are a more significant risk, than in the whole store environment for single sheets of paper. The stack effect may alter these conclusions with pollution concentrating in stacks of paper and ventilation only providing an extremely slow mechanism to reduce such accumulations. An accelerated aging test to estimate the effect of emissions on paper has been reported (Strlic, et al.). Storage materials used across the English Heritage (EH) collections have been tested, along with new materials from conservation suppliers. This will inform which materials are suitable for the long term storage of paper based archives, and whether EH need to repack any collections. It will allow us to recommend a replacement, which is also relevant to the wider sector. Results of materials tested to be presented include archival storage boxboards, polyester sleeves and acid free tissue, amongst others. The methodology of Strlic et al. is clear, the interpretation of the results will be discussed. The impact of different environmental control strategies on the lifetime of paper will be assessed.

Applications of anodized aluminum extrusions in book conservation

Alessandro Scola

Aluminum is the most abundant metal on Earth's crust and the second most used metal globally, just behind iron. Its low density, high strength, and natural corrosion resistance make it the perfect material for a variety of applications in very different industries, e.g. aerospace, automotive, packaging, construction, electrical, and electronics. Extrusions are formed by physically forcing a block of the metal through a smaller cross-sectional dial shaped as a 'negative' of the final extruded profile. Eventually, to further thicken their protective and natural external oxide layer they can be anodized. A series of practical questions sparked the research into new materials and designs that eventually led us to implement anodized aluminum profiles in a number of projects. Could a 40 pounds antiphonary from the 15th century be safely stored, transported, consulted, and displayed without being manually lifted? Could the spine under treatment be secured vertically and rotate around a horizontal axis? Could a cantilevered sewing frame be built that was portable, lightweight, and with a minimal footprint? Additionally, how could 60+ postcards be displayed, possibly recto and verso, in just a handful of hours? This paper describes how aluminum profiles have been successfully used in creating several original structures, including our answers to the above questions, aimed to improve the efficiency and ergonomics of the conservator performing her/his daily tasks, or to solve preservation and exhibition problems. All designs are based on standard profiles customized by simple machining processes and have been finalized by using a free 3D modeling software.

Woven fabrics in book conservation: an investigation into the properties of aerolinen and aerocotton

Nikki Tomkins
Co-authors: Celia Bockmuehl, Johanne Keiding, D.J. Carr, R. Critchley, A. Peare

Woven fabrics commonly referred to as 'aerocotton'and 'aerolinen'are valued for their strength and flexibility in conservation treatments. Although fabrics have a long history in the production and repair of books, aerocottons and aerolinens are relatively recent materials adopted from early aircraft production. In 2007 the main supplier of these woven fabrics to the UK conservation community ceased production, and new producers started supplying a range of fabrics under the labels of 'aerocotton' and 'aerolinen'. Understanding the strength, composition and longevity of repair materials is central to conservation practice and this investigation tested two aerolinens and two aerocottons alongside the discontinued aerocotton to quantify their relative strengths. Treatment and application of the fabric varies, and this investigation sought to compare the fabrics both before and after laundering, and in three orientations (warp, weft, and bias). The tests conducted measured mass per unit area, thickness, sett, tensile strength, folding endurance and dimensional change of the fabrics. The results provided quantifiable data to understand better the variation among fabric sources and the differences between cotton and linen variants. The collaboration between material scientists and practical conservators in this project ensured that the tests carried out were applicable and relevant, and to internationally recognised standard test methods. These results provide information to guide conservators in the preparation and use of aerocottons and aerolinens.

Collections Care 1
Meeting Rm 2a, 14.20 – 15.40
Chair: Jane Thompson Webb ACR

Preventive conservation redefined: the historic housekeeping perspective

Katy Lithgow ACR, Helen Lloyd ACR

The practice of preventive conservation in UK historic houses open to visitors is the modern manifestation of a cultural tradition of care. Historic housekeeping, as described in contemporary treatises, was practised by the household, whether family or employee. Today this care is practised by graduates in museum studies and conservation. Is it still relevant for preventive conservation to acknowledge these roots, or is traditional housekeeping a barrier, perceived as a quaint reflection of a bourgeois or aristocratic past, rather than contemporary practice underpinned by heritage science. The revision of the National Trust's Manual of Housekeeping for 2020 is provoking two of its principal authors to reflect upon this question. Conservation aims to retain maximum tangible and/or intangible value, expressed in NT historic house interiors through the authentic 'open' display of collections. Open display increases the risks of damage particularly from particulate and chemical pollutants. Preventive conservation aims to make access sustainable, using 'hands-on' traditional methods as well as 'hands-off' science and technology, implemented by conservators as well as by the staff and volunteers whom they train and guide. Knowing when and how to practise preventive conservation requires skills acquired through informal learning and practical experience as well as from text books and courses. As the conservation profession matures, role titles and terminology will change; Whether called housekeeping or preventive conservation, in National Trust houses the practice of preventive conservation is part of a living, breathing cultural tradition, embracing hands-on care for historic materials as well as hands-off management of their environment.

Reassessing Assumptions - Tailoring Preventive Conservation to Collection Needs

Karen Bradford
Co-author: Paul Garside

Consistent protocols and procedures ensure that preventive conservation measures, such as environmental control, pest management, transport, handling and material stability testing, can be applied in a consistent and reliable manner. These procedures are typically based on a combination of conservation training, ethics and experience, knowledge of the collection and its needs, published standards and research, measureable data and availability of resources. However, intelligent assumptions are often necessary to interpret and employ this information, and furthermore all of these factors can change over time. Therefore it is important that these procedures do not simply become set in stone as institutional 'traditions', divorced from their original purpose and intention; the risk of this increases as support documentation becomes dissociated from policy documents, and as a 'soft' knowledge is lost with staff turnover. To ensure that procedures remain relevant and appropriate to current needs, it is necessary to understand the underlying assumptions which have informed past practice, and reassess them in the light of current knowledge and understanding, a process which can be supported by risk management approaches. This paper will explore how these issues are currently being addressed at the British Library, and the lessons which have been learnt, using three case studies: the necessity of the current non-standard environmental conditions for the philatelic collection; the requirements for handling and transport of collection items, reassessed using data from impact monitors; and the use, interpretation and impact of chemical stability testing of materials to be used with collection items.

Hillsborough Castle: Opening doors, exploring stories, inspiring the future for everyone

David Orr ACR
Co-author: Kathryn Hallett ACR

Built in the 18th century, Hillsborough Castle is the residence of the Secretary of State for Northern Ireland and the place where many formal and informal stages of the Peace Process took place; and also the official residence of Her Majesty the Queen in Northern Ireland. In 2014, Historic Royal Palaces took over the management of Hillsborough Castle from the Northern Ireland Office (NIO) and, since then, has transitioned the site over 5 years to become a major heritage visitor attraction, completing April 2019. This HLF-funded major project has transformed Hillsborough Castle, part of a masterplan to conserve the site, increase access, and provide enjoyment, learning and participation opportunities to visitors and communities. It comprised several concurrent capital projects and associated activities: construction of new visitor facilities, a new learning centre, restoration of the gardens, and a complete re-presentation of the State Rooms. This paper will discuss how we have established collections care regimes, creating protocols for conservation-safe events and environmental management, setting up purpose-built conservation facilities including emergency planning and salvage, and training household staff in collections care. We will evaluate the work required to decant and re-instate over one thousand collection items from multiple lenders, installing protection requirements and overcoming challenges during the major capital project to re-present the Castle interiors. The paper will explore how Historic Royal Palaces' conservators have worked to adapt our experience in the preservation of historic collections and sites to a multi-stakeholder working residence, within the context of a strategic vision to dramatically increase access and transform the visitor experience.

Dynamic Objects
Meeting Room 2a, 09.30 – 10.50
Chair: Kenneth Cobb

A New Code of Practice for Turrent Clocks

Janet Berry ACR
Co-authors: Chris McKay, Derek Frampton

Turret clocks in churches and other public buildings are dynamic objects that people expect to see working. Our presentation will discuss the recent development of a new code of practice for their maintenance, repair and conservation, and the shift in conservation philosophy and practice that is emphasised in the new code. The Church of England has around 4,000 working turret clocks. These make a positive contribution to the buildings that house them and if it is a striking clock it makes a particular aural contribution to the surrounding area. An out-of-use turret clock has a negative impact that is surprisingly strong. The Church therefore values working turret clocks and promotes the skills and expertise needed to maintain, repair and conserve these clocks. To ensure that all working in the turret clock sector are working to the same principles, the Turret Clock Advisers' Forum initiated a new Code of Practice for working practitioners and advisers to follow. There was a wide consultation for the draft code with everyone concerned including companies, individual clockmakers, and the Church Buildings Council and its turret clock conservation committee. The code emphasises the shift in practice towards a less interventive approach and more towards conservation principles recognised in many other conservation sectors. As such it promotes a very important philosophical change in turret clock practice. This presentation will discuss the issues, processes and evaluations that led to the development of the code and looks to how it may be supported in the coming years. http://www.clocksadvisersforum.uk/info.html#next

Cybernetic Umbrella: A Case Study of Kinetic Art Conservation at Tate

Carla Flack ACR
Co-authors: Louise Lawson; Jack McConchie; Ming-Yi Tsai

Tate has a long history of displaying and treating kinetic works of art which have their own unique technical and ethical questions. A collaborative approach has had the most successful results for these complex artworks. In this presentation I will highlight how we draw upon various skills sets available including; conservators, technicians, engineers and manufacturers. While simultaneously maintaining a continuous communication with the artists or artist foundation to ensure there is a consistent anchor to maintain the difficult balance of artist intention with technical functionality. Our approach will be illustrated through one case-study, Wen Ying Tsai's Umbrella (1971). Tsai began making cybernetic sculpture in 1966 and this work is composed of vibrating rods lit by high frequency strobe lighting. The rate of flashing in the rods created a visual undulation which is responsive to sound, for example hand clapping. This work presents a range of complex challenges including; material fatigue, obsolescence, health and safety and how to present the work for display. Collaboration is critical and the approach made the most of the combination of external contributors with the wide range skills, knowledge and innovative thinking found in Sculpture and Time Based Media in the conservation department at Tate. This presentation evaluates the challenges encountered, the decisions made and the treatment solutions implemented. It also places the case study within the wider context of the conservation of kinetic and light artworks at Tate and how it has informed our current approach.

Bringing Nancy Astor's electric canoe back to life: the restoration of Liddesdale at Cliveden

Vicki Marsland ACR

The National Trust acquired Nancy Astor's electric canoe, 'Liddesdale', in 2016 thanks to two generous donors. This elegant and beautifully crafted vessel was commissioned from a Thames boat yard in 1920. She continued to be enjoyed after being sold in the 1970s, and in 1990 she was purchased by Cliveden House hotel and refurbished with a new electric motor to take guests on river excursions. After being operational for nearly 90 years, in the more commercial environment she fell out of favour and sadly five years of neglect ensued. Following acquisition, the Trust initiated a fundraising campaign to save the Liddesdale. While other institutional custodians may opt for static display at this stage of a vessel's life, the Trust decided to maintain the Liddesdale as a dynamic object in Cliveden's collection. In accordance with National Historic Ships guidance, this route follows a 'sunset' approach to restoration with the vessel's significance underpinning decisions about remedial interventions. A small team of boat builders, recently graduated from the International Boatbuilding Training College in Portsmouth, became resident to undertake the work inside Cliveden's Boat House in view of visitors. The project fulfills several of the Trust's strategic objectives as well as Waldorf Astor's Memorandum of Wishes, 1942 stating that he wanted the estate to be maintained 'in as perfect a condition as possible'. The restoration work is accessible, the ongoing commitment will maintain the improved condition and bringing the original function back to life will provide experiences that move, teach and inspire.

Leadership and Advocacy 1
Meeting Rm 1a, 14.20 – 15.40
Chair: Simon Cane ACR

Conservation narratives and the power of language

Hannah Clare ACR

Cultural heritage enhances society's capacity for connection, well-being, tolerance and empathy. These are things that the world desperately needs right now. Access to culture is a human right and in this paper I want to call on Conservators to talk about that more, conveying our passion for preserving heritage and what it can do for society. Wherever we are, we need to express ourselves as part of a bigger system with an ultimate common goal. We can advocate for the benefits, inspire others with the power of connection and stimulate crucial investment in the sector. Conservation can tell such an engaging and different story. But, if it is important to change the story that we tell about our work, it is more important to change how we tell that story to ourselves. Part of that is simply changing the language we use. It is powerful and it can change the way others see us and our work but also how we see ourselves. I will explore the idea that we are already inclusive and collaborative and suggest the danger that our close networks make us exclusive. We have been talking about the importance of communication for a long time now. Are we getting it right? If we can root out old narratives and take our place at the table, we can change the world.

Conservation Leadership

Amber Xavier-Rowe ACR

Positive conservation leadership where expertise and confidence combine to effect real change and influence is perhaps an aspiration of many a conservator, at English Heritage this has become a reality. This presentation will outline the key steps that have led to conservators and conservation scientists leading on decisions about conservation priorities and strategies. It will be a personal reflection working over a number of years at English Heritage. Starting with the importance of a long term team based conservation strategy and using a range of examples both at EH and at other organisations. These will help to illustrate the crucial role of conservation expertise not just in an advisory capacity but in a decision making leadership role. This will lead to the conclusion based on the presenter's experience that conservation is better off not being categorised or hidden as a subsection of collections management. Whilst it is important that many are involved with the delivery of conservation measures the priorities and strategic direction must be led by conservators and conservation scientists, to establish the profile of the profession and to ensure long term sustainable conservation is ultimately achieved.

Conserving the Conservator: how leadership skills can help to overcome challenges and barriers to progression

Julie Bon ACR

Co-authors: Jannicke Langfeldt, Claire Magill, Karenna Fry, Bridget Mitchell, Eliza Penrose

The Icon Leadership Launchpad programme, in conjunction with Transforming Performance, was launched in February 2018 bringing together conservators, from across the specialisms and from both private and public practice, on a journey of personal discovery. The course has been delivered by webinar using both training and coaching sessions. Each of the participants is different, and faces different daily challenges at work, but we are united in our ambition progress in conservation. This paper will summarise the techniques that we have been learning and adopting and will offer examples of where this has brought personal results. The paper will then widen out to address the question of how we can work together to conserve the conservator, and the conservation profession, through the application of leadership skills. This section will be based on the results of our research coming out of the ACR conference in December 2018, where the Leadership Launchpad group will ask questions around leadership, advocacy and value to elicit responses across the sector. This information, plus further research post conference, will allow an analysis of what the challenges and barriers are perceived to be. The paper will then go on to offer some ideas for solving these issues, based on learning, discussions and experience from the Leadership Launchpad programme. The key aim of this paper is to engender discussion and debate within the sector about how conservators can become leaders and how we can all support, and learn from, each other to move the profession forward.

Paintings 1
Meeting Rm 3a, 14.20 – 15.40
Chair: Annette King ACR

Radical Paint: Acrylics in the Swinging Sixties

Patricia Smithen ACR

Co-authors: Bronwyn Ormsby, Aviva Burnstock

Three exhibitions between 1960 and 1966 highlighted abstract artworks from 'The London Scene" of both established artists and up-and-comers, including John Hoyland, Bridget Riley and Bernard Cohen. The featured paintings were all oversized, abstract works reflecting the shift of influence from European to American avant-garde artworks. The artists were breaking free from traditional painting techniques, still being taught in art schools, to embrace new paint types and radical methods which allowed them to explore new paint forms reflective of the radical social upheaval of the sixties. Many of these artists were amongst the first to use acrylic paint in Britain and the first to encounter both its advantages and limitations. This paper will describe the artistic practices reflecting this early transition period from oil paint to acrylic paint,

based on recent interviews with artists and paint manufacturers, archival research and the technical analysis of paintings featured in these exhibitions. As well as providing insight into material availability, the paper will illustrate some of the issues particular to early acrylic paint formulations in Britain.

The atypical restoration of a painting wounded by war: the case of Migette's "Graoully" - Airbrush non-illusionistic painting conservation treatment

Carole Clairon-Labarthe
Co-authors: Claire de Fleurieu, Claire Meunier, Stephanie Deprouw-Augustin

Damaged during the bombings of World War II and declared lost, Auguste Migette's Le Graoully was rediscovered in 1999 in 80 pieces in a box in the Metz museum storage (France). After the canvas treatment, the picture's appearance remained altered by a network of tears and major lacunas: in particular, a critical gap on the right-hand side left 17.7% of the painting's surface missing. The composition and the painting's quality were both impossible to read and appreciate. The main challenge of the pictorial conservation was to restore the unity of the painting while keeping visible its unique story. Two black and white photographs from the 19th century could be used to give a sense of the composition, not its colours. For these reasons, a non-illusionistic reintegration over a smooth filler was chosen and performed with an innovative retouching tool: the airbrush. This trailblazing restoration was performed at the National Centre for Research and Conservation (C2RMF) studios in Versailles (France), and required a close collaboration between curators and conservators. From Photoshop manipulations of the early photographs to recreate an underdrawing until colour layering using airbrush and stencils, a two-year long, brand-new conservation treatment was necessary. The airbrush loaded with Gamblin colours enabled to emulate the artist's vibrant and transparent technique and was particularly suited to the challenge posed by the surface of the loss. This visible reintegration allowed to work on colours and shapes, while keeping the painting's losses discernible thanks to the texture and appearance of the retouching technique itself.

Reflections on surface changes in the paintings of Gary Hume

Helen Brett ACR
Co-authors: Rachel Scott ACR, Bronwyn Ormsby

Hume's material choices contribute significantly to the aesthetic and optical intent of his paintings. Since his seminal 'Doors' series of the late 1980s, his paintings have been characterised by colourful planes of household gloss paint, bordered by low linear ridges, on aluminium sheets. While these structures remain robust, fatty acid efflorescence has begun to emerge, ranging from glittering white crystals to subtler reductions in surface gloss. Hume's attitude to this change is clear - he is happy to have efflorescence removed and indeed does so himself, but his thoughts on longer term change are more ambiguous. 'Water Painting' (1991) was cleaned in 2017, following a comparative study of Hume's paintings at Tate, and extensive consultation with the artist. This paper will evaluate strategies for the maintenance of these artworks and explore the influence of Hume's views on change. High gloss is key in his own evaluation of his surfaces and yet his acceptance of nature's influence both during making and in subsequent signs of ageing directs us to be tolerant of subtle changes in appearance. He is keen for conservators to preserve the intended 'look' of his paintings yet he cannot offer specific criteria for judging this in the future. This project highlighted the difficulties of obtaining accurate documentation and the limitations of measuring gloss. For the present, our judgement of when reduction in gloss warrants conservation intervention is guided by Hume's own value judgements, but his ambivalence toward longer term changes makes us question our tolerance of signs of ageing in contemporary art.

Sustainable Thinking
Meeting Room 2b, 14.20 – 15.40
Chair: Sandra Smith ACR

The adaptive re-use of buildings: realising the conservation that we all (can) live in

Graham Voce, Adam Klups

The majority of UK housing stock dates to before 1980 as do many other public and commercial buildings. As the UK develops we build anew, but we also adapt our existing environments for changing personal and professional lives. Many of us will live and / or work in adapted buildings - houses into flats, churches into residential, industrial buildings into offices, offices into residential - and this process is so common in the UK that most are unaware of their part in this. By living in and maintaining re-purposed housing or professional structure we are maintaining the built heritage of the UK and we are all living in and with conservation to as greater or lesser degree. So what? Some re-use may be uncontroversial - Victorian or Edwardian houses - some more contentious - churches re-purposed for housing, retail or commercial use. So what should conservation professionals be doing as part of this knitting together the demands of modern living with older structures? How are we to try to make sure that what we see as heritage responsibilities are respected when adapting a structure to a new purpose? Heritage listings schemes in the UK moderate and protect; planning rules guide and make sure that modernity is effectively put in place - but is this enough? What are the responsibilities of the users of adapted buildings - do they see that they have any? Where does the conservation professional become involved? And does this make all of us conservators to some degree?

Taking responsibility for the past: Conservators' role in the care of contested heritage

Pia Edqvist

Many collections world-wide were created out of a colonial context. A history of abuse, genocide, slavery, discrimination and broken promises. To address the legacy of these atrocities 'decolonisation' was developed, a physical and intellectual freeing from the colonisers' ideas, and part of this is the use of language. Discussing the subject of language in other related fields, the ethical responsibilities of a particular group or profession is often highlighted, where is this discussion in conservation? In this talk, I will present case studies addressing ethical responsibilities and conservation practice in relation to decolonisation and contested heritage. I will also show examples of practice from related fields bringing a broader discussion to the subject. I will show how these discussions relate to conservation and how this can inform conservation practice. This discussion will include case studies addressing the care of human remains, but also archive, heritage sites, the intangible and much more related aspects. This consideration also includes the people, which this heritage belongs to. These people need acknowledgment, transparency, openness, respect and most of all access to their legacy. We are custodians of cultural heritage and therefore we take responsibility for the past, honest in the present and transparent for the future.

Sustainability in Conservation: Material Use and Sustainability

Caitlin Southwick

Co-authors: Mariana Escamilla-Martinez, Bianca Gonsalves

The movement toward sustainable thinking and living is no longer a scientific issue, but an ethical one. The cultural heritage sector is embracing more sustainable practices and taking a stand on issues of climate change, and now conservators are adopting this way of thinking. Sustainability in Conservation (SiC) aims to address these issues through building awareness and promoting sustainable practices in conservation and related fields. SiC conducted several international surveys to collect data on the topic. The results of these surveys demonstrate the demand for more information and communication regarding sustainable practices and alternative materials and treatments. Three of these surveys are examined: Materials in Conservation, Solvents and Plastics Use by Conservators. Questions were designed to identify concerns regarding sustainability issues as well as to assess and calculate the number of problematic materials in use. Results illustrate that conservators are concerned about their environmental impact, with plastic and solvent usage identified as primary areas for improvement. The use of toxic solvents and the lack of confidence in green labelled materials- partly attributed to insufficient research or access to research- seems to be a major issue hindering conservators to use alternatives. Regarding plastic use, the largest problem seems to be related to recycling. While most participants expressed an interest in recycling, a lack of resources seems to deter action. The results of these surveys enable conservators and researchers to set project goals focused on the necessities of professionals in order to facilitate the transition to a more sustainable future.

Textiles 1
Meeting Room 3b, 14.20 - 15.40
Chair: Janie Lightfoot ACR

Taking the Strain: Using Digital Image Correlation to monitor strain in tapestries displayed on slanted supports

Frances Lennard ACR

Co-authors: Rosa Costantini, Jafar Alsayednoor, Philip Harrison, Maggie Dobbie

It is increasingly common for European museums to display historic tapestries on slanted supports, in the belief that this will reduce the level of strain to which they are subjected. However to date there has been no systematic investigation to compare the effectiveness of slanted support and traditional vertical display, nor to identify appropriate parameters for slanted supports. The research presented here aimed to quantify the reduction in strain created by slanting support boards at different angles. The study is part of the broader interdisciplinary project at the University of Glasgow, From the Golden Age to the Digital Age: Modelling and Monitoring Historic Tapestries, which is using engineering techniques to assess the effectiveness of tapestry conservation and display practices, in close collaboration with textile conservators at Glasgow Museums who are preparing tapestries for display in the refurbished Burrell Collection. In particular, the contactless full-field optical technique Digital Image Correlation (DIC) was employed to monitor strains in historic and model tapestries displayed at various angles. The tests were designed to separate the effect of the slant from the role of friction in such systems. Although it is common for supports to slant only slightly, often at only 5° from the vertical, they are usually covered with velvet or similar fabrics where friction reduces the effects of self-weight loading. The study has contributed to the validation of DIC as a technical tool for the monitoring of cultural heritage artefacts, identifying criteria for the successful analysis of historic textiles.

A low tech approach to high tech analysis

Hannah Sutherland

Digital Image Correlation (DIC) is an analytical tool which allows for mapping of strain inflicted by stress upon a surface. This 'map' can be read as a coloured image overlay, where levels of strain areas are noted by a colour gradient. In recent years this tool has been successfully used to record strain upon hanging tapestries through the Tapestry Monitoring Research Project. The hardware and software required to produce DIC data can be expensive. In order to make future research more accessible, this initial phase trialed various open-source DIC processing tools. It also utilized equipment such as departmental

digital cameras and free photo editing software. Photographs, before a stress was applied and after a stress was applied, were taken of several identical fabric samples; all artificially damaged and then 'conserved' with support fabric and lines of laid-thread couching. These sets of photographs were processed through a series of open source DIC software to compare the outcomes of each program and success of different cameras. Software was considered from various angles including accuracy of image processing, speed of image processing and ease of use for staff without engineering backgrounds. The chosen camera and software combination will be used in the second stage of the project, which starts in 2019. That stage will focus specifically on analyzing how the spread of laid-thread couching away from areas of damage impacts the spread of strain on a hanging (non-tapestry) textile.

Collections made of fragments: Samples of Pre-Columbian textiles

Elizabeth Palacios

What are usually left from early collected archaeological textiles are the aesthetics, the marvelous details that make them unique. There has been a tradition of collecting archaeological objects by scholars since XIX Century through scientific explorations and academic researches. However along XX Century Pre-Columbian objects were appraised as core of Peruvian national identity, that perspective was slowly followed by legislations which allowed textiles, ceramics, masks among others objects been commercialized along XX Century locally (and abroad illegally). There were as well many private collections of archaeological Textile fragments. One of them is a small but significant collection belonging to the National School of Fine Arts, containing around hundred small pieces with great aesthetic and technical characteristics – however, links to their original context is almost lost. They were available for students for aesthetic research and studies of antique art traditions, together with other collections of regional art. This case study addresses themes as local collected archaeological textiles and their interpretation in mid XX Century, interpretations of Pre-Columbian objects, relevance of the collection's purpose in their care and role, which has influenced preventive conservation actions to make the collection case study accessible and to engage with academic community as they are now accessed as cultural heritage of the School.

Libby Ireland and Claire Taggart consolidating
'Sea Form (Porthmeor' (1958) by Dame Barbara Hepworth.
Photograph by Carla Flack © Tate 2018

Book and Paper 2
Great Hall, 16.10 - 17.30
Chair: Shona Hunter

Conserving the Scottish Session papers for digitisation

Nicole Devereux

The Advocates Library, Signet Library and Centre for Research Collections are currently collaborating on a pilot project to conserve and digitise a collection of Scottish Session Papers. These documents were used in the presentation of cases in the Court of Session and consist of around 5000 volumes. They range from the mid-17th century to the 19th century and are a valuable and unstudied source of Scottish history. The aim of the pilot project is to ascertain the time needed and the associated cost to conserve the collections prior to digitisation. Due to the large number of volumes that need to be treated, quick and efficient methods of conserving the volumes need to be developed so they can be digitised safely. The presentation will briefly describe the project and the treatments carried out. It will also discuss in more detail two innovative techniques used to stabilise volumes where the text block has split in half. An evaluation of each treatment will be provided. The challenges faced and improvements that could be made will also be discussed. It is hoped that this paper will be useful for other institutions who wish to carry out similar large scale digitisation projects of bound volumes.

Rebinding the Ruzbihan Quran: contemporary considerations for the conservation of bound Islamic manuscript material

Kristine Rose-Beers ACR

This talk will focus on the final stages of a six-year project to research and conserve the spectacular Ruzbihan Quran (CBL Is 1558). Made in Shiraz in the mid-16th century, this manuscript represents the pinnacle of Safavid manuscript production. Disbound in 2012 to facilitate conservation, the Ruzbihan Quran became the centre of an international research project, including collaboration with the IPERION-CH MOLAB initiative. It was the subject of a focused exhibition in 2016 and a dedicated monograph, including a chapter on the scientific analysis of the manuscript's palette, was published in 2018. The conservation of this manuscript was informed by previous experience working with Islamic manuscripts and drew directly from the author's experience conserving a 17th century Persian Shahnama with near identical concerns in 2006 (London: Institute of Conservation, 2007). However, the need to employ these techniques and methodologies once again offered a timely opportunity to review the current theoretical approach to Islamic manuscripts in museum collections, in light of best practice, scientific research, and the continuing trend for studies of Islamic manuscript materiality. The decision to disbind museum objects remains a contentious subject, and yet it happens frequently. As digitisation is now a primary demand on collections, does it entail a more rigorous treatment approach to the codex, or do bound objects simply return to their box to die once their digital surrogate is created? The Ruzbihan Quran offers a case study through which the best approach to reinstating historic bindings can be discussed, along with the challenges of preserving Islamicate manuscript material in current conservation practice.

The First Act: Preparing the Parliamentary Archives for a Future Move

Kirstin Norwood, Rhiannon Compton
Co-authors: Thomas Bower, Mairead Walsh and Charlotte Grimsdell

This paper will discuss the Parliamentary Archives' Pack & Track project, aimed at preparing the contents of the Archives for a future move away from the Palace of Westminster during a period of refurbishment. Specifically, it will focus on The Modern Act Room, which houses Acts of Parliament from the reign of Queen Victoria to the reign of Queen Elizabeth II. From the surveying of this collection's contents "the first of its kind in the over 154 year history of the Archives" to the resulting tender process which provided the opportunity to evaluate different archival storage options, the paper will look at the planning of the project and the challenges that arise when working with a collection of this kind. It will show how a process to combine the conservation cleaning, packing and tracking of the collection was devised. In particular, it will reflect on the compromises made to satisfy both the conservation and cataloguing requirements of the project. It will also consider how project management skills training could benefit conservators involved in similar projects. Going on to outline the preservation work undertaken, including cleaning and rehousing, the paper will then demonstrate how the project has improved the condition in which the Acts are stored and helped ensure their longevity. Finally, the paper will reflect on the data produced by the project and the benefits this will have for the Archives and those who use them now and in the future.

Leadership and Advocacy 2
Meeting Room 1a, 16.10 – 17.30
Chair: Sara Crofts

Are we getting the right message across? An evaluation of contemporary practices in public engagement

Isobel Griffin ACR
Co-author: Sarah Wilmott

Engaging the public with the conservation of cultural heritage can assist with connecting conservation to the wider social, economic and political environment. This paper will describe and evaluate contemporary practices in public engagement, arguing that initiatives may backfire if the 'conservation voice' is pitched inappropriately. Heritage organisations have realised since the late twentieth century that the public are interested in conservation, and this has led to the creation of exhibitions about conservation and attempts to make conservation activity more visible, for example with the opening of the Conservation Centre in Liverpool in 1996. Most large heritage organisations deliver programmes of conservation tours and talks as a matter of course. In the twenty-first century, the advent of social media offers unprecedented opportunities for talking about conservation. This will be demonstrated with reference to two conservation projects undertaken at the National Library of Scotland which were promoted through social media: the treatment of the 'Chimney Map' and the #RescueMe project. The potential for the message to be overly simplistic or sensationalist and the consequences of this will be explored. This paper will also consider how the increasing use of volunteers in conservation activities can be a particularly powerful form of engagement, to the extent where providing an engagement experience may be the primary motivation behind a volunteering programme. With reference to the programme at the Library, the paper will ask whether volunteers are given a realistic view of the conservation profession, and how this affects perceptions about conservation in the wider environment.

Exploring a Multicultural Education Model to Enhance Conservation Education

Melissa Tedone and Adam Foley

Diversity, equity, and inclusion form the core of a critical, ongoing conversation in the conservation profession. As we collectively assess the political, educational, economic, and cultural forces that have created the current state of the profession, a research project at the Winterthur/University of Delaware Program in Art Conservation (WUDPAC) explores the use of multicultural education models to enhance the inclusivity of conservation education. In 2017, Dr. Adam Foley, Associate Director of Equity and Inclusion, University of Delaware, and Dr. Melissa Tedone, WUDPAC Affiliated Assistant Professor, initiated a three-year, longitudinal research study to assess WUDPAC curriculum content and delivery through a multicultural lens, and to gauge the awareness and understanding of current WUDPAC students about issues of diversity, equity, and inclusion as they progress through their conservation education. Multicultural education seeks to ensure educational equity for members of diverse racial, ethnic, cultural, and socioeconomic groups, and to facilitate the participation of all students as critical and reflective citizens. Furthermore, multicultural education seeks to provide students with educational experiences that enable them to maintain commitments to their community cultures as well as to acquire the knowledge, skills, and cultural capital needed to function in a multiculturally-inclusive global society. This pilot study for WUDPAC will potentially benefit other training programs and cultural heritage institutions. Meaningful partnerships between preservation professionals and multicultural education practitioners offer a promising path to truer representation within the conservation field, in turn reflective of a richer valuing and safeguarding of all cultural heritage.

Belfast City Hall at night
© BelfastCityCouncil

Collections Care 2
Meeting Room 2a, 16.10 – 17.30
Chair: Karen Bradford

The Toil and Trouble of the Anoxic Bubble: Pest Eradication Consternation

Bethany Skuce and Sarah Bashir
Co-authors: Jamie Hood, Adrian Doyle

The British Museum is currently undertaking the largest collection move project in its history; the relocation of the Africa, Oceania and America collections from offsite storage to a new storage facility at the main museum site. A central objective of the move project is to attain a zero reference point for pest activity at the new store. To achieve this, all objects are subject to an expansive Integrated Pest Management procedure that includes anoxia treatment for between 20-30% of the collection being relocated. Due to recent changes in European Union legislation, the project has redeveloped its approach to anoxia treatments. In collaboration with a commercial company, the Museum has worked innovatively to build on existing CO2 treatment methodologies used on world cultures collections. With conservators taking the lead on data collection, management and interpretation, informed practical solutions have been developed. These developments have also resulted in cost effective and efficient treatments within the scope of a time sensitive, complex project that is constantly evolving. By designing a new internal structure and employing different materials, the use of the standard, single use bubble has been extended over several treatment cycles to improve the sustainability of the procedure. With proactive involvement in data gathering, it has been possible to utilise technology to analyse data that is comprehensive and consistent across treatment cycles. This has constantly informed further, ongoing developments to the procedure to the extent that the Museum's external collaboration has informed improvements in similar pest treatments within the food industry.

Turning up the Heat. A user review of heat treatment to eradicate Death Watch Beetle (Xestobium rufovillosum)

Robert Entwistle ACR

Ipswich Museum is a local authority run Museum with a large and varied collection. In March 2017 our IPM monitoring flagged up an infestation of Death-watch Beetle in a store affecting our Tudor/Elizabethan timber collection. The number of beetles that were appearing were quite alarming and we knew it was too big a job for us to tackle ourselves. We asked for advice from a number of pest control firms. Most asked us to move the beams and clear the store. This was impossible and too expensive. After deliberation we contacted and engaged a firm who managed to tackle and eradicate by raising the temperature throughout the whole store (including our natural history collection). This paper will talk about what I did to ensure the objects were safe, such as moving vulnerable objects. What went wrong, and what I would not do again. This was an innovative treatment. The company were as interested to see the outcome as I was. I will use images, RH and temperature charts to illustrate the paper.

Advancing management practices for storage of archaeological metals

Johanna Thunberg, Nicola Emmerson and David Watkinson

Surveying practice in the post-excavation storage of archaeological iron has revealed the complexity of the decision-making process for archaeologists and conservators and a distinct lack of evidence-based guidance to direct protocols. Immediately post-excavation, free water in corrosion product layers can create high humidities and drive destructive electrochemical corrosion. Advice on drying techniques is limited and conflicting, leading to ad hoc practices and consequent danger to objects. Once dry, chloride-bearing compounds can make archaeological and marine iron artefacts unstable down to 15% relative humidity (RH). For most museums and archaeological units, long-term corrosion control is by desiccated storage which relies on creating and maintaining low RH microclimates in plastic boxes. Success of these microclimates is driven by air exchange rates of boxes which are in turn dictated by box design and size. Along with the mass of silica gel included, these variables determine the lowest RH achievable and its longevity. Without empirical evidence of the influence of these variables, effective management of storage procedures is impossible. This paper delivers new data on the influence of post-excavation drying, storage box variables, mass of silica gel and gel regeneration cycles in successful creation of desiccated microclimates. Combining this with corrosion rate data for iron objects between 20-80% RH allows predictions to be made about the risk to objects of following a range of common protocols. Guidance on best-practice drying and storage procedures to minimise corrosion and enhance object longevity can now be offered to the heritage sector.

Heritage Science 1
Meeting Room 2b, 16.10 – 17.30
Chair: Sarah Hunt

Maximal Intervention: Extreme solutions to vinegar syndrome

David Mills

The standard protocol for dealing with cellulose acetate media degradation (vinegar syndrome) in film archives is to keep it in cold and secure conditions and if at all safe and possible, to copy the film to new media. What do you do when the original film is a one-of-a-kind copy of a much beloved TV series that is so far gone along the vinegar syndrome path that it is little more than a corrosive,wet, gelatinous mass? At Queen Mary we previously demonstrated the ability to use high contrast micro-computed tomography to perform virtual unrolling of damaged parchment and paper. With the enthusiastic consent of the film archivist, we investigated imaging a reel of 16mm film. A small scale pilot project was begun and we quickly acknowledged that the laws of physics stood in our way as the largest volume we could image at sufficient resolution was 1 cubic inch. All standard ethical considerations would mean no further work could happen, no archive would even agree to store the film. In the end, given the rate of degradation of the material combined with it's uniqueness, all options to enable the imaging to proceed were considered. The selected method goes against most current conservation and archive thinking - we chopped up the film. This paper presents the methods and results of this maximal intervention approach.

The development of magnetic nanocomposites for the removal of destructive acids from marine archaeological wood

Eleanor Schofield
Co-authors: Esther Rani-aluri, Enrique Sanchez-Perez, Rachel O'Reilly, Serena Corr

The Mary Rose was a 16th century Tudor warship, commissioned by Henry VIII. After 34 years sailing, the ship sank off the coast of Portsmouth in 1545. Rediscovered in the late 1960s, the remaining hull emerged from the Solent in 1982 and now resides in Portsmouth Historic Dockyard. In 2013 the consolidation treatment of the wood was completed and an air drying process commenced. During this phase samples have been periodically taken to monitor the evolution of iron and sulfur, which originate from sulfate ions in seawater being transformed by sulfur reducing bacteria, and iron from dissolved fixture and artefacts. Using X-ray Absorption Spectroscopy, it has been confirmed that drying induces the oxidation of these phases and their formation can be correlated to wood degradation. This finding highlights the need for treatments to combat this destructive process. Previous treatments at the Mary Rose were successful in neutralising the acid source within the wood, but did not remove problematic compounds from the wood. Here we have exploited the ability to functionalise magnetic nanoparticles with compounds capable of sequestering iron ions. The magnetic function allows us to drive the treatment into the wood, and also to drive it out. In addition, the nanoparticles are embedded in a thermo-responsive polymer producing a gel which can easily be applied to the wood and transformed into a solution by a minor temperature change. Here we show initial results and discuss the factors requiring further investigation in order to translate this into a viable conservation treatment.

Hydrofluorocarbon Solvents: Novel Material Applications for Cleaning and Acrylic Solvation

Michael Doutre
Co-authors: Odile Madden, Gyllian Porteous, Lisa Imamura, Amandina Anastassiades

Increasingly, the field of conservation seeks safer and more environmentally friendly practices. Halogenated solvents, like methylene chloride, were developed to have a wide variety of unique properties and uses in industrial cleaning. However, these solvents impose significant safety and environmental concerns, making them less desirable for conservation treatments. In recent years, environmentally green halogenated solvents have been developed that incorporate hydrogen atoms on at least one of their carbons. These hydrofluorocarbons have many similar properties to their perfluorinated counterparts, but have lower health and safety risks, and no ozone depletion potential. The unique properties of these solvents, including extremely low viscosity, low chemical reactivity, and lack of need for stringent environmental, health, or safety controls make them attractive for many possible applications in conservation treatments. In this work we examine the use of one such hydrofluorocarbon solvent, 2,3-dihydrodecafluoropentane, which is available commercially as Vertrel XF(tm). While generally unreactive to most materials, Vertrel XF easily solubilizes acrylic polymers, such as Paraloid B72, which opens possibilities for conservation adhesives, consolidants, and varnishes with similar handling, mechanical, and optical properties to those made with acetone or toluene, but with no flammability and low toxicity risk to the conservator.

Modern Materials
Great Hall, 11.20 – 12.40
Chair: Adriana Francescutto Miró

Preserving biodegradable plastic masks at the Science Museum

Vanessa Applebaum

In 2018, the Science Museum acquired two biomedical face masks composed of polycaprolactone (PCL), a biodegradable plastic. One is undecorated and was used by an adult to hold their face still during radiotherapy treatment. The other is a mask meant for a child and has been designed to look like the superhero Batman. Both are intended for long-term display in one of the newly refurbished Medicine Galleries. Little is known about the exact compositions and aging properties of these objects. Conservators at the museum must now devise a collections care plan with very little information or precedent to guide them, as they confront the possibility of future degradation or damage to these objects. This presentation is based upon the research and work of myself and colleagues at the Science Museum. Through the lens of the two PCL masks, it will focus on the ethics and approaches to the preservation of significant objects composed of materials that are meant to be ephemeral, as well as how the long-term plans for the objects impact their place in the museum's collection. The overall aim is to illustrate the many complications and compromises that are now especially relevant for preserving modern materials.

Assessment and Treatment of Electrical Circuits in a 1930's Model Hospital for The Science Museum, London

Kenneth Cobb
Co-author: Francoise Collanges

The conservation of electrical objects has not yet been explored academically because existing electrical power supply systems are often repaired rather than assessed under conservation-restoration guidelines. In 2017 The Science Museum proposed to study the possibility of reinstating electric lighting within a 1930's model of a hospital. The paper specifically addresses this request as a specialist conservation-restoration project with other aspects being handled by the museum's conservation team. Past treatment of the object aimed to restore electrical circuit failures or modify functions used for its ongoing display. Our assessment uncovered previous methods of maintenance and repair and will present their impact on current performance and safety. The model (about 4m long, 1.20m high, 1m wide) is made up of five separate interlocking buildings. Each room is lit with at least one low voltage incandescent lightbulb. Lighting circuits group lights together. Over time external wiring has been modified, but internal wiring between floors remains inaccessible and the incandescent lamps used are no longer available. With a total power requirement of 380W they present serious problems of heat management, old wiring and degradation to adjacent surfaces. The museum wanted to use LED lamps and to introduce dynamic lighting. The presentation will describe our evaluation techniques and electrical tests used to determine the state of the electrical network, treatment according to the ethical rules of conservation-restoration, the proposal of technical solutions respecting the electrical networks still in place to restore their fullest function potential, and, a specification for suitable 'white' LEDs.

Ephemerality, values and new models: an approach to Graffiti and Street Art Conservation

Rita L. Amor Garcia

Graffiti and Street Art have become an unmissable part of any contemporary city. They have arisen as independent expressions, parallel to more institutionalized art forms. In their aim to present a new imagery in cities, the urban artists have managed to make the public aware of the potential and power of their ideas, and consequently, the public has added values to these art forms. These values play an important part in our current view of Graffiti and Street Art, not only in accepting them as 'art forms' but also in presenting possibilities in their conservation. Contrarily of what is commonly thought, independent artworks in public space are not always made to disappear. The ephemerality mainly depends on the materials used and the environment. Although many urban artists accept or use this ephemerality as their art-concept, sometimes this transient idea is transformed and revised in favour of those same artists, communities, art dealers, etc. On the process of recognition of artworks, addition of values and understanding this fluctuant reality, theoretical and practical conservation standards need to be adapted to Urban Art. Generally, the approach could resemble others employed for contemporary artworks. However, in order to work dutifully, it is compulsory to review specifications that these practices own. The paper proposed here will aim to: - understand purposes and methods of Urban Art, - describe the values that offer interest to the conservation of Graffiti and Street Art, - highlight the importance of considering adequate conservation possibilities for the Urban Art's future

Paintings 2
Meeting Room 3a, 16.10 – 17.30
Chair: Julia Nagle ACR

Conservation of Russian Abstract art of the second part of the 20th century. Accepting the challenges

Anastasia Yurovetskaya
Co-authors: Irina Kadikova, Elena Iurovetskaia, Marina Voronina

For more than 30 years Russian Abstract art of the second part of the 20th century was rejected not only by the authorities, but also by general public. But still some groups like The New Reality studio kept working from 1958 until 1991 and left a big artistic legacy. At the present time, as paintings and installations, created by members of the group, are becoming a part of state museum and private collections, conservators face serious challenges treating them. Low quality painting materials, experiments in mixing techniques and bad storage conditions led to serious problems with state condition of art pieces. None of them had ever been treated by conservators before, some even had not been dusted. Specialists from the State Research Institute for Restoration recently started to collaborate with the Russian Abstract Art Foundation in preserving paintings of The New Reality studio. Conservators experienced problems at all stages of treatment processes, e.g. adhesives could change the tone of the colours, painting layers could be water sensitive or have such a pastose relief that traditional methods of cleaning had to be left aside. Restoration of the pictures required technological examinations, making tests for conservation materials and careful decision making. The talk will focus on case studies and a comprehensive approach to research and conservation issues. Some detail on practical solutions to the problems of choosing conservation methods and their translation into action will be discussed.

Synthetic Organic Pigments in Talens artist oil paints: The Fanal pigments

Rika Pause
Co-author: Klaas Jan van den Berg

The Dutch paint manufacturer Talens & Co (now Royal Talens) started the production of oil paints in 1899 in Apeldoorn. The recent research agreement between Royal Talens and the Rijksdienst voor het Cultureel Erfgoed (RCE) gives the latter unique access to the company's historical archive, which still exists and allows researchers to gain insight in the early oil paint production of this globally-represented company in the beginning of the 20th century. The study presented here deals with synthetic organic pigments in Talens oil paints. Through combining archival production recipes with instrumental analysis of historic Talens paint tubes, pigments were linked with their commercial names and set into their art-technological context. As an example, this paper will focus on the investigation of the commercial origin and chemical composition of the Fanal pigments, which were produced by the company I.G. Farbenindustrie starting in the mid-1920s. Furthermore, the possibility of the recreation of the Fanal pigment in the laboratory will be addressed. The main aim of this project will be to conduct material-technical investigations on modern oil paints containing synthetic organic pigments to determine possible causes of paint degradation, which may be used for targeted conservation approaches.

Study of Indoor Spray Paints on Canvas within French Museums

Emilie Faust

Some French museums have gathered works of art painted with spray paints by graffiti artists since the 1980s and throughout several decades. It led to the establishment of broad Street Art collections like the one of the MuCEM (Museum of European and Mediterranean Civilisation). Although spray paints have received minor attention in the art conservation field, degradations were observed in the paintings. The CNAP (National Centre of Fines Arts) research grant was awarded to us to study the indoor spray paints on canvas in French collections, assessing their state and developing their material history. Eight paintings on canvas were selected between 1985 and 2004. State reports and documentation were first recorded and then artists were interviewed for a better understanding of the works of art and spray paints practical use. Analyses were performed to identify the paint composition while complementary literature on manufacturing and evolution of spray paints was investigated. Observations revealed several ongoing alterations, either caused by paint degradation process or resulting from spray paints technical defect application. Artists racking spray paints habit explains the diversity of brands and types (household, car paints, etc.) on the paintings for which the quality impinges on the stability issue. Analyses mainly identified alkyd modified binders, and they are more likely to be dispersion according to manufacturer's information. However, the spray paints formulations history is very complex, and further research needs to be done to better understand the materiality and the degradation process looking for sustainable conservation solutions.

Textiles 2
Meeting Room 3b, 16.10 – 17.30
Chair: Frances Lennard ACR

Illuminating the Ancient Process of Light Bleaching of Textiles

Caitlyn Picard
Co-authors: Rene Dancause, Crystal Maitland, Season Tse and Janet Wagner

A preliminary study, undertaken at the Canadian Conservation Institute, aims to investigate the potential of light as a viable alternative to chemical bleaching following methodologies set out by paper conservators. Although not commonly practiced today, the use of light to bleach textiles has been used since ancient times. Often used in paper conservation, there has been very

little published in conservation literature regarding the use of light bleaching for historic textiles. In 1979, Annis and Regan investigated the use of light bleaching on historic white cottons, while Gardiner and Hackett (1998) spoke of using a calcium hydroxide bath for light bleaching of large textiles. Eleven sets of laboratory tea-stained and naturally aged cotton samples were tested using two techniques: immersion and non-immersion in alkaline solutions (pH 9) prepared using calcium hydroxide. Sample sets were each exposed to a single light source: sunlight (average 109,774 lx; up to 4 hours), light-emitting diode (LED, 23,325 lx; up to 24 hours), and ceramic metal halide (CMH, 42,256 lx; up to 24 hours) with a cumulative light dose of 0.44 Mlxh. Samples were removed at different time intervals, with colour and pH measurements carried out to determine the rate of colour change. In addition, microfade testing (MFT) with a xenon arc light source was undertaken to compare bleaching results among the different light sources. The amount of colour reversion from natural and artificial ageing along with the effectiveness and rate of light bleaching by immersion and non-immersion techniques are compared.

Behind the Unpredictable Response of Indigo Carmine Dyes in Aqueous Environments

Laura Garcia Vedrenne

Indigo carmine is a textile-based acid blue dye which was used throughout the eighteenth and nineteenth centuries. The poor washfastness of indigo carmine is a problematic issue for textile conservators, although little is known or discussed about the specific causes and mechanisms behind its colour-bleeding. This paper discusses in-depth research which was required to build on current published knowledge and conservation practice. An experimental methodological approach was adopted to answer whether the low washfastness of indigo carmine showed variations according to dyeing conditions and formulations. For this, historical dye recipes were critically reviewed to find trends in use and manufacture. After identifying relevant variables in preparation and dyeing methods, different formulations of indigo carmine were recreated. Dye transfer and solubilisation for replica wool samples were experimentally assessed by visual examination and colourimetry. For the first time, a relationship between the lightfastness and washfastness of indigo carmine was identified, showing the impact of numerous interconnected factors on the dye's behaviour when wet. Further experimentation with historical samplers from the Karen Finch Collection allowed for comparison between theoretical arguments and expectations from practical conservation experience. The research showed that an overly simplistic view of the dye's behaviour during wet cleaning prevailed in the literature. Experimental findings confirmed that the likelihood of dye loss and colour change after wet cleaning is very high. It is suggested that textile conservators assess risks thoroughly before carrying out aqueous treatments.

All Shot Up? Ballistic and Technical Investigation into early 20th century Irish Flags

Rachel Phelan
Co-author: David O'Leary

As part of the All- Ireland commemorations of the Decades of Centenaries (1912-1922) the great flags of the period, from all sides, were conserved for exhibition display. Often individual and idiosyncratic in design these objects by their very nature have attracted many conflicting narratives. On examination of the pieces, many displayed unique patterns of damage to the fabric substrate. Could further investigation of this enlighten some of the disputed issues? While undertaking the conservation, as well as researching the historical record, scientific analysis into the battle damage was carried out. Collaboration with An Garda Siochana (the Irish Police Force) National Technical Bureau and the Irish Defence Forces; and has shed new light on the flag's construction and use, as well as the nature of the damage sustained. Where the origin of a flag was disputed, it has also lead to further clarification. By engaging with external experts, comparison of the oral history with the scientific discoveries was made possible and has impacted the conservation and display of the pieces. Enhanced understanding of the objects, has also lead to wider social engagement from all sections of society, in both Ireland and Northern Ireland. Flags investigated include, the Flag of the Irish Republic, The Starry Plough of the Irish Citizen Army, both in the National Museum of Ireland, Dublin. The 36th Ulster Base Depot Flag in the Ulster Museum, Belfast and the recently discovered Green Harp Flag in the possession of the Inniskillings Museum, Enniskillen, Co. Fermanagh currently displayed in Liberty Hall.

The Conservation Studio at People's History Museum

Conference Sessions
DAY 2 – Friday 14th June 2019

Collections Care 3
Meeting Room 2a,
09.30 – 10.50

Developing and applying contemporary conservation practice to British Library on Demand

Emily Watts

British Library on Demand is the document supply service from The British Library. Items are purchased specifically for the purpose, in addition to the legal deposit collection, to provide remote access to over 42 million items. Users include libraries, higher education institutions, private and commercial customers across the UK and internationally. Launched in 1962 as the National Lending Library, with a focus on STEM, at its peak in the mid - late 1990s, four million requests were received a year. Items are supplied as scanned digital copies or are sent by post. This type of use results in the collection undergoing significant physical forces. Its use, combined with the age of some items, in some cases the poor quality materials they are produced from, means parts of this collection are in poor condition. Modern mass produced items are also easily damaged. Past treatments have been designed to anticipate and support heavy, continued use of these items and have consisted of binding parts together in to volumes and reinforcing slimmer items. Potentially some items in this collection are unique, and the library may hold the only copies. Combined with decreasing acquisitions budgets, the possibility that copies for some items are no longer available, requires a review and change in approach to conserving this element of the collection. This paper will discuss a review of its preventive and treatment conservation and how contemporary conservation practice could be applied in order to preserve and continue to enable access to the document supply collection.

One Collection: Harnessing digital technology for collections moves

Emily Yates

Co-author: Louisa Burden ACR

As the largest and most ambitious programme the Science Museum Group has ever undertaken, One Collection will transform how we care for, access and share our internationally significant collection with the world. Over the next five years we will photograph, pack and transport 300,000 objects from Blythe House in West London to a new purpose-built collection management facility at our National Collections Centre in Wiltshire. This new facility will house over 80% of the Science Museum Group Collection, and from 2023 will create greater access. Moving this vast number of objects has created opportunities to improve engagement with our collection. We are undertaking a digitisation project which will create one of the most extensive online scientific collections in the world. This also brings the challenge of ensuring that every object is assessed for hazards and condition to ensure they are safely moved. The Science Museum Group has embraced barcoding and a new Rapid Data Entry programme to enable large volumes of data to enter our Collections management System. This new technology has allowed us to focus conservation programmes to objects most in need, allowing for greater efficiency and directing our conservation skill to where it is needed most. The hazardous nature of our collections has allowed for unprecedented specialist knowledge and skilled teams to be created. We hope the large scale of this project will set the standard for moves of this nature and complexity. We aim to be the trailblazers and anticipate that others may learn from our mistakes.

Have you got this one? The development of a web-based insect pest recording database

Jane Thompson Webb ACR

Co-author: David Pinniger

Entomologists and field biologists have spent many years looking at the distribution of insect pests both in the UK and worldwide. A Google search brings up 9,700,000 hits. It would therefore seem that there is little left to know about what insects are where and what they might be eating. This figure is misleading, however, as it primarily refers to outdoor crop, forestry and horticultural insect pests. There is very little information on the distribution of indoor insect pests, and particularly those that infest museum collections. In 2009, the authors developed a website using Renaissance in the Regions funding. The site www.whatseatingyourcollection.com was devised to be a source of information about IPM and insect pests with a photographic reference guide. This was welcomed as a useful resource, but many people working in IPM asked questions for which there were no answers as the only data was anecdotal and based on personal experience. They wanted to know: Are these insects everywhere or just in my museum? Do certain insects prefer certain types of museum building? Are the new insects pests present in the UK as a result of climate change? A second part of the website was therefore developed as an insect pest recording tool. IPM co-ordinators in UK heritage institutions were invited to record the insect finds from their trapping programme on a quarterly basis. The presentation will look at what the recordings reveal so far and see if it is now possible to answer some of the questions posed about insect distribution.

Contemporary Art 1
Meeting Room 1b, 09.30 – 10.50
Chair: Louise Lawson

Zombification? Retaining 'Live' when documenting and conserving Performance Art at Tate

Ana Ribeiro
Co-author: Louise Lawson

When reading Rafeal Lozano-Hemmers, "Best practices for conservation of media art from an artist perspective" (2015), the authors were struck by the description of the contradiction that is conservation: that of keeping work as a living entity not as a fossil and at the same time accepting its potential 'zombification,' i.e., taking the work's intention away when joining a museum's collection. This idea of 'live' as opposed to zombie particularly resonates with performance-based artworks which oscillate between being active and dormant and only when they are performed that considerations around their preservation and conservation can really occur. Across the last two years time-based media conservation has been reviewing and reflecting on their practices and methodologies in relation to the conservation of performance works within the collection. Therefore, they have led the development of a strategy for the conservation and documentation of performance-based artworks, building on the practice-based research conducted at Tate. Performance art demands a wider understanding of what documentation means and how it needs to be practised ensuring the ongoing and authentic realisation of these works in our collection. How can we make documentation active in a way that is not lost in translation and will keep the work alive within the collection? This presentation will explore the creation and application of the strategy, with a focus on the recently acquired performance "Your Face Is/ Is Not Enough" by Kevin Beasley.

To perform or not to perform: Mary Kelly's 'An Earthwork Performed'

Helia Marcal and Duncan Harvey

To perform or not to perform? This question has been widely discussed since museums began acquiring performance art. The ephemeral, event-like nature of performance implies that an artwork's materiality needs to be negotiated every time it is shown. These negotiations prompt debates around issues of authenticity and change involving various agents from conservation and curatorial departments. This presentation aims to explore how conservation processes might be vectors of change in the trajectory of performance artworks, and how, in turn, performance art challenges ideas about originality, contextuality, and, ultimately, conservation. An exploration of the conservation process at Tate, illustrated with the case study An Earthwork Performed, a performance and installation work by the American artist Mary Kelly (b. 1941), created in 1970, will form the basis of this presentation. An Earthwork Performed was initially conceived of as a performance wherein an individual shovelled coal for 70 minutes accompanied by a variety of audio and visual elements. In 2012 it was adapted to be shown as an installation comprised of 400 Kg of coal, a shovel and microphone, a CRT monitor showing video of the initial performance, and two digital audio elements emulating other sources of sound (including that of a reel-to-reel tape player present in the space). The intent is to have the installation version with the potential to activate the performance. This paper will explore issues of performance art and technological obsolescence while discussing the role of conservation in shaping materiality of artworks that exist in-between technology, performance, and the archive.

Instantiation, Actualisation, and Absence: Enacting and Conserving Katie Paterson's "Future Library" (2014-2114)

Brian Castriota

In 2014, a hundred trees were planted in a section of forest on the outskirts of Oslo, Norway. As these trees grow over the next century, a different author is invited to contribute a text every year, which is handed over to the city of Oslo in a ceremony in the forest each summer. There, only the title of the text is announced to the public while the contents of each book will remain unread until 2114 when the trees will be felled and a thousand copies of the anthology will be printed. Until then, a growing collection of unread manuscripts will be held in a specially designed chamber in the Oslo Public Library. This is the premise of Katie Paterson's "Future Library" (2014 - 2114), a century-long public artwork whose conceptual mandate may only be fulfilled through the work's long-term conservation. But as an artwork that exists entirely outside the museum and enacted in the absence of any official "conservator," how is such a work being preserved? What lessons might such an unconventional artwork offer more conventional museum practice with respect to contemporary art and the roles of conservators? And are these lessons truly novel? This paper uses Paterson's "Future Library" to not only consider familiar questions around material significance, artistic intent and sanction, and distributed authorship, but also to challenge frameworks built around clear-cut divisions between an artwork's creation and its implementation. Through an examination of an artwork that breaks with conventional ontologies, temporalities, and structures, this paper seeks to expand existing frameworks and consider the role of trust in enacting and conserving contemporary art.

Having It Large 1
Meeting Room 1a, 09.30 – 10.50
Chair: Keith Scobie-Youngs ACR

Current approaches to the practical repair of the external terracotta of the Natural History Museum

Angus Lawrence ACR
Co-authors: Catherine Woolfitt, Fiona Lamb RIBA, Tom Bardwell

This paper presents the next stage to The External Terracotta Facades of the Natural History Museum (A case study in no-destructive survey & investigation). The Grade I listed Natural History Museum is known to many as a much-loved London landmark and one of the most extraordinary terracotta buildings ever constructed. Previous maintenance and repairs have involved damaging over-cleaning using acids, replacement of original sections of terracotta and poorly executed fills and grouts using inappropriate materials.These mistakes have been acknowledged and the latest interventions represent a major departure from previous treatments. The current approach is based on a better understanding of the construction of both the building and its individual elements. Deterioration, in the form of cracks and surface losses, is understood to be centred on structural issues. A complete survey of the Waterhouse faÃ§ade carried out by rope and MEWP has provided a detailed record of the condition of the terracotta and enabled deterioration to be categorised and prioritised. The most urgent areas of concern (both in terms of the safety of users of the museum and the fabric of the building itself) have been addressed by minimum but necessary intervention using techniques and materials compatible with the original construction. Limited dismantling of damaged areas has provided an opportunity for both detailed inspection and the selection of appropriate repair techniques. Extensive trials and samples (including the use of mock-up elements) have been carried out for lightweight grouts and surface repair mortars and the subsequent repairs will be carefully monitored in order to inform future interventions.

Architectural Conservation Projects and their Stories

Maniyarasan Rajendran

Architectural conservation projects in small towns of India are unique. Successes of these initiatives are anchored in determination of some dedicated professionals and small firms. Trial-and-error, spontaneous decision making, and interdisciplinary approaches are arrived not for the sake of scientific innovation but from specific conditions. Creativity and improvisation are the key. Use of new technology provide critical backing for conservation projects with limited supplies. Knowledge and experience of the stakeholders remain limited in parts. These pieces of information are seldom converted into useful knowledge for future. Along the course of time these key aspects of project evolution are lost. Nowadays, these small conservation teams communicate through social media, and decisions are made in these platforms. This paper explores the idea of recording the stories of conservation projects and their processes. The author has the experience of documenting conservation projects across India. Documentation frameworks were developed based on visual tools such as photography, aerial photography, time lapse motion and photogrammetry. In addition, this paper will look to establish junctures where the documentation tools, assisted the conservation teams in understanding and solving the issues in situ. From these constraints in mind, the case examples presented in this paper shall be significantly different from well-resourced conservation projects. To name few: (1) aerial photogrammetry helping to determine the profile of an Indo Saracenic dome. (2) panoramic photography a ceiling made of papier mache within a 18th century colonial building (3) timelapse motion images revealing the comprehensive extent of various processes.

Conservation treatment of Daniel Maclise's Royal Gallery wall paintings: Collaborative research informing approach

Rebecca Tehrani, Elizabeth Woolley ACR, Richard Lithgow ACR

Since Daniel Maclise (R.A.) completed his two monumental waterglass wall paintings 'Waterloo' and 'Trafalgar' in the Royal Gallery, Palace of Westminster in 1865, their presentation has been a constant issue. Due to their perceived early deterioration over the past two centuries numerous attempts at restoration were conducted (1874-1964). Today, this diminishes our visual appreciation of the paintings, this is yet further spoiled by the current lighting system. In 2017, a remedial conservation programme was commissioned by the Curator's Office and is now ongoing. Leading up to this three MA research projects were commissioned from Cologne University of Applied Sciences (2012-13, 2016-18). Utilising both scientific and archival research this has provided a comprehensive technical and historical overview of the paintings that informs the ongoing conservation programme. The research established a chronological account of previous interventions, and the conservation materials used. These were contextualised in the stratigraphic and topographic framework of the wall painting. Colorimetry measurements were taken and the effects of LED relighting were evaluated though digital simulation. During the remedial treatment pilot phase options for cleaning and presentation were explored. Close examination of original technique, visualization of previous repainting through multispectral imaging, and the understanding of condition based on new research, helped establish that although the two paintings share a similar treatment history, differences in technology and condition necessitate distinct treatment approaches. As a result, respective conservation methodologies for each painting have been developed. These are now being successfully implemented while the potential for relighting is being explored.

Heritage Science 2
Meeting Room 2b, 09.30 – 10.50
Chair: Dr Eleanor Schofield

Creating constructive pathways to aid ethical sampling decisions in scientific research for cultural heritage

Anita Quye

Co-authors: Matija Strlic, Eleanor Schofield

Sampling material from historical and archaeological objects and sites for scientific research carries great responsibility. Deciding whether to sample and how best to use the material and information generated is a balancing act between reward and risk that requires considered negotiation, sound justification and good management. There can be no hard-and fast rules nor one defined route for sampling because each case is unique in its purpose and context. When crossroads are met, a shared and common understanding between everyone involved is necessary to agree the pathways. This makes guiding principles within a framework of professional ethics important, and why the Icon Heritage Science Group (HSG) committee decided to prepare such a guide through consultation with Icon members and other heritage professionals in the UK and internationally. The resulting ethical sampling guidance led by Icon is pioneering in its practicality and inclusivity through different perspectives for those involved in the decision-making process. The consultation usefully raised crossroad challenges that resonate with anyone involved in sampling decisions, especially whether to sample or not, ownership and responsibility for data and samples, and managing expectations. In this presentation, short case studies reflecting these challenges are presented by three experienced heritage scientists who have led sampling projects for collection management, academic research and professional training. Discussion revolves around their perspectives on key factors impacting their decisions when creating constructive pathways.

Integrating and Visualizing Heritage Collection and Reference Sample Data

Fenella France

The analysis and characterization of cultural heritage includes multidisciplinary data from many diverse fields; including materials science, archeology, botany, biology, engineering, physics and chemistry, to name but a few. One of the challenges we face is how to characterize and predict longevity and treatments on collection items. Scientific reference samples that replicate collection materials are critical for the capacity to interpret and understand the optimal methods of preserving our collections. Aligned with this capacity is the need to be able to share our results and reference collections with colleagues. An initiative to house and make available scientific reference samples is the Center for Library Analytical Scientific Samples (CLASS); a collection that includes the Barrow collection (1000 books from 1500-1900) fibers, pigments, fabrics, papers, parchment, AV materials and others. for linked scientific data generated from heritage materials has been developed within the Library of Congress Preservation Research and Testing Division. The Center for Linked Analytical Scientific Samples 'Digital (CLASS-D)' is an infrastructure enabling the unique capability to link a range of types of scientific instrumental analyses and samples. This database integrates multiple scientific analyses all linked back to the original heritage object or reference sample. For ease of access, a visualization interface has been created that includes curatorial information, this integrating humanities and heritage science to create a 'digital cultural object'. These layers of integrated and linked data expand the capability for managing web-accessible access to heritage collections through the Data Visualization Project (DVP) visual interface.

Research, Imaging and Interpretation in the Heritage Sector

Chris Pickup

This research proposes that symbiotic relationships can be developed within the non-national museum sector with their regional universities. Independent Research Organisations have the facility to engage with scientific research. However, the challenges for museums in our regional cities to engage in scientific research are substantial. There are motivations for non-national museums, heritage scientists and conservators to establish these relationships: the museums can enhance object biographies to create narratives for public engagement and interpretation; University based heritage scientists have opportunities to demonstrate impact and conservators can facilitate enriched object biography through their work. This feeds directly into the creation of public engagement for the museum hence developing their role & status. Modern investigative techniques used by conservators and heritage scientists have the potential to produce impactful imaging, which this research proposes could be combined with 3D modelling and film, allowing conservators and heritage scientists to co-produce micro documentary for public engagement in non-national museums. However, as well as motivations, substantial barriers exist in funding structures, staffing levels within non-national museums and conservation and career pressures for university-based heritage scientists. This research centres on case study of heritage scientists producing such a micro documentary for museum interpretation supplemented by a survey of scientific research and interpretation practice. Through this auto-ethnographical approach the research enables a first-hand experience of navigating this difficult relationship. Exploring both the influence of staffing and funding and how the differing expectations and approaches demonstrates in real terms Catherine Dillion's (2014) 'Rigour Relevance Gap.'

New Conservator 1
Meeting Room 3b, 09.30 – 10.50
Chair: Jane Henderson ACR

The twenty-first century conservator: training, skills and employment

Christina Rozeik ACR

What type of conservation jobs are advertised in the UK? How much do they pay? What skills and experience are employers looking for? And are we training conservators to meet these demands, as well as the wider needs of the cultural heritage industry? This paper addresses these questions by presenting the results of an ongoing job market survey in the UK, stretching back over 10 years and based on jobs advertised in the UK over that period. The aim is to gain a clearer understanding of the UK employment market in conservation, and to find out what skills and experience employers are looking for, and how this varies. Data is collected about 'headline' facts such as duration of contract, working hours, salary, location, conservation discipline and sector. A subset of jobs (approximately the most recent 8 months) will be analysed in further detail, drawing additional information from the role descriptions and person specifications where available. This will provide information about the tasks involved and any management responsibilities for each job. Data will also be gathered about personal characteristics sought, including accreditation, educational level, prior work experience and competences. This paper gives a comprehensive overview of the recent job market in conservation, including comparative data from previous conservation workforce surveys and from other heritage professions. It also compares these results with existing research about conservation training and about the skills sought by employers. Finally, it considers whether we are training conservators to meet the demands of the twenty-first century profession.

Addressing the Needs of the Conservation Profession - The Evolution of Internships at the British Library

Cordelia Rogerson
Co-author: Paul Garside

The British Library has a long track record of providing formal, paid internships, which offer a stepping-stone for students to develop into professional conservators. Initially these provided a broad grounding in traditional conservation. However, over time and based on practical experiences, the programme has become more focussed and specific, offering exposure to new career pathways and addressing skills gaps, thereby better supplying the needs of the student, the institution and the wider profession. The BL is particularly well placed to do this; the size of the conservation department, the extent and variety of the collection, and the broad range of related activities (such as exhibitions, loans and digitisation), means that interns can experience the reality of working in a large institution and the internships can incorporate the most current aspects of evolving library activities. This allows students to understand and hone particular skill sets, especially those associated with emerging developments. To this end, the Library has recently hosted internships which have focused on conservation research and on exhibitions and loans, and is currently co-hosting (with The National Archive and the Bodleian Library) an internship dealing with the particular requirements of conservation for digitisation as a novel career path. This paper will discuss the development of the internship programme in response to the current and changing needs of the profession, by addressing skills gaps and providing experience in emerging aspects of the discipline, thus enabling students to both contribute to the field and further their own careers.

HMS Caroline: staying afloat

Diana Davis

HMS Caroline is a WWI light cruiser, the only surviving ship that took part in the Battle of Jutland, and former home of the Ulster Division of the Royal Naval Reserve in Belfast. Decommissioned in 2011, she has been restored through partnership between the NMRN and Department of Enterprise, Trade and Investment with a grant from the Heritage Lottery Fund. She was opened to the public in 2016 in the heart of Belfast's Titanic Quarter. Caroline is moored at Alexandra dock on Belfast Lough and still afloat so must be maintained as a ship. She contains gallery and interpretation spaces, hosts educational workshops and evening events and houses a cafÃ© on the upper deck. All of these functions must be accommodated within the ship, itself a very large historic object. Yet without the income generated from commercial activities, the costs of maintaining the ship would not be met. Conservation is therefore a complex affair. Restoration and opening the ship up to the public safely required compromise on some critical conservation tenets. In everyday running, a diverse conservation team including shipwrights, riggers, conservators, curator and maintenance technicians is required to keep the ship in condition, working alongside commercial and education teams to ensure that all functions are carried out without detriment to the historic fabric. Using the case of HMS Caroline, this paper will discuss the diversification needed within the profession in the developing field of historic ships conservation.

Photographic Materials 1
Great Hall, 09.30 – 10.50
Chair: Jacqueline Moon ACR

Proud to Be Protective Parents: A Case Study of Safe display of Calotype Negatives in Tokyo

Saya Miles, Jenny Harvey

'The Origin of Photography' was a groundbreaking exhibition which took place in Spring 2019 at the Tokyo Photographic Art Museum. It showcased the British photographic treasures in a context that illuminates the influence of English and Scottish forerunners in the history of photography. It challenged the long held view of the origins of photography in Japan and it was the first-ever exhibition that displayed so many original copies of historical photographic materials held by British institutions. The Historic England Archive received an object loan request for thirty items of its archival holding to be displayed in the exhibition. Despite the fact that the museum recently completed thorough renovation work of the building and is now equipped with the state-of-the-art exhibition and storage facilities, the archive was very cautious about loaning out such historically significant and delicate objects; especially the display of Calotypes with transmitted light caused the biggest concern. The museum offered to create special exhibition cases for displaying the Calotypes equipped with OLED light which emit no UV and minute amount of heat. The archive conservators were heavily involved with determining the specification of the case. The conservators also explored the mounting method using special acrylic boards to minimise harmful contaminants and radiation as much as possible. After both sides were satisfied as the result of careful planning, numerous discussions and preparation, the objects travelled to Tokyo, were displayed and came home safely. This is a case-study of how the protective parents (HE Archive) and the sincere borrowing institution (TOP Museum) achieved the safe display of Calotypes by utilising the latest technology in close collaboration across time zones, language and 1000s of miles.

Investigation and conservation of the Ernest J. Bellocq glass plate negative collection

Elsa Thyss

Discovered by Lee Friedlander in an antique store in 1958, Ernest J. Bellocq's Storyville images made in the early-twentieth century in New Orleans were revealed to the public through an exhibition at MoMA in 1970. Friedlander exhibited his own prints made from the original Bellocq glass plate negatives at the MoMA exhibition. To date, any original prints from Bellocq's days have not been found. In 2013, The Met acquired the collection of 88 original Storyville glass plate negatives from Friedlander. For the first time, the collection is available for investigation and analysis. The extraordinary history of these negatives and the absence of contemporary prints raises questions that go beyond typical methodologies for treating gelatin glass plates. This talk will present identification of the negative materials carried out through in-depth visual examination, multi-spectral documentation, and scientific analysis. All was carried out with the goal of understanding the manipulations visible on the negatives, and their function in relation to the prints that the photographer may have intended to produce. One major conservation issue is the flaking of the binder from the glass support, which is very challenging in part because of the different chemical nature of gelatin and glass. After conducting a series of experiments, we have adapted an innovative approach developed in 2001 by photograph conservator Dominique Viars, which has proven to be efficient and to meet conservation ethics. We will present the experiments conducted to adapt this method and stabilize the physical damage of the Bellocq negatives. Further, by using digital technologies to create custom transparent conservation housings for the plates, we aim to foster access for scholars to view these outstanding photographic objects.

What to do with thousands of degrading negatives

Jordan Megyery
Co-author: Jacqueline Moon ACR

The National Archives has a film collection that includes a large number of loose negatives, mixed with paper records in files and books. The film in these files is largely undocumented, but sources indicate many thousands of negatives. Cellulose acetate becomes extremely acidic as it ages and can make adjacent materials brown and brittle. The National Archives doesn't have a plan for the preservation of these records, and as custodians we need to make conscious decisions to preserve them and minimise deterioration. The Collection Care department is leading a project to gather information on the quantity, location and condition of these negatives and to estimate the costs of different approaches. We have highlighted the issues to the executive team and are now testing possible solutions, including physical barriers to protect adjacent materials, freezer storage, physical or digital surrogates and separating the image layer from the degraded film base. The Collection Care department recognises that any solution will require input from colleagues across the organisation; they will help determine the condition and location of the records, collate metadata, suggest techniques for digital storage, work towards cataloguing and advise on health and safety. Volunteer help is also needed to survey such large numbers of negatives. This talk will discuss how we have collaborated, the resources that we needed and the practical solutions that we decided on.

Stone and Wall Paintings 1
Meeting Room 3a, 09.30 – 10.50
Chair: Peter Martindale ACR

Scraping for progress: the juxtaposition of progression and practice in Architectural Paint Research

Phillipa McDonnell, Rosie Shaw

Architectural Paint Research (APR) is the analysis and research of decorative surfaces. Developed in the early twentieth century in Colonial Williamsburg, it has been practiced in the UK since the 1970's. APR has always strived to offer more than simply describing the colour of the original surface from paint scrapes, so that a structure can be returned to its 'former glory.' A multidisciplinary technique, APR is constantly inspired by developments in other disciplines, pushing our methods to create results that are accurate, meaningful, and have long-term value. However, APR is often a commercial venture, and too often we are being ask to quote for briefs that are vague to the point of meaninglessness, or that specify outdated or inappropriate methods. At a time when 3D and portable analysis technology allows us to produce authoritative results presented in innovative ways, it seems incomprehensible that the most revolutionary concept in APR is that the client knows what they are commissioning and why, and that work that meets best practice is seen as a standard, not a luxury. This paper aims to discuss developments at the forefront of APR, however it is also a call to arms. As a discipline fighting to progress, we need to highlight the juxtaposition between what we are able to achieve, and what we are being specified to deliver. Through client, public, and professional education, development of standards, and the support of professional bodies, we aim to reduce the constraints on APR, and allow it to flourish.

Bellweathered; Reigate Stone at the Bell Tower, Tower of London

Martin Michette
Co-authors: Heather Viles, Constantina Vlachou, Ian Angus

The Bell Tower is one of the oldest parts of the Tower of London, dating to the 12th century. It still contains a large amount of original masonry, including significant quantities of Reigate Stone. Reigate Stone was medieval London's principal freestone. It is highly porous, weakly cemented and prone to rapid decay; however, certain typological variations appear quite resilient. The precise mechanics of decay remain poorly understood. Different patterns and rates of decay are evident in similar environments. Historic treatments and historic pollutants complicate matters further. Understanding the relative importance of material, environmental and historical factors in ongoing decay will be vital to improving the resilience of Reigate Stone masonry in the face of changing climate. This is particularly evident at the Bell Tower, where at least two different typologies of Reigate Stone were used in construction. These are exposed to a range of micro-environments varying in aspect, height and degree of shelter. There is relatively good documentation of past treatment and replacement programmes. As such the Bell Tower is a useful bellwether for understanding Reigate Stone decay. An 18-month monitoring programme has been implemented to investigate the response of Reigate masonry to micro- and macro-environmental conditions. The programme combines a range of field-surveying techniques with a network of data logging equipment. The results will establish Reigate Stone decay patterns and any inherent typological differences, identify the most damaging environmental mechanisms and inform the development of preventive conservation strategies.

New formulations for strappo detachment in contemporary murals

Rita L. Amor Garcia

The conservation of wall-paintings using detachments has been an intricate topic of discussion since the 18th century. Between the 20th and the 21st centuries, the systems went from being excessively used to almost obsolete in conservation practice. Many theorists criticized that overuse of the detachments by inexperience and neglected-practitioners that led to the loss of murals that could have been preserved using alternative treatments. However, there are examples where using either staccoes or strappo detachments ensured the preservation of many wall-paintings when the environment did not permit other mechanisms. Due to its obsolescence, little research has been done on wall-detachments in the last decades. Consequently, its use in contemporary mural conservation does not feature in current academic literature - despite there are examples of their use. It is widely known that the composition of materials used in contemporary art differentiate from traditional techniques. Conservation procedures could follow traditional practices although, variations would be required. Therefore, the use of detachment systems requires specific changes in order to adapt to materials currently used in wall-paintings. My research on the conservation of contemporary murals focuses on the use of strappo detachment in contemporary murals. Traditional procedures in the treatment have been tested, reviewed, adapted and improved. The results present a new method that has been developed specifically to meet the needs of modern paints composition. This poster presents the procedures and results of the research, introducing and explaining changes and alternative methods for strappo detachment in contemporary murals.

Contemporary Art 2
Meeting Room 1b, 11.20 -12.40
Chair: Deborah Cane ACR

Uncovering Robert Rauschenberg's Fossil for Bob Morris, 1965

Vincent Dion
Co-authors: Claire Taggart, Stephanie Lussier, Briana Feston-Brunet

Robert Rauschenberg's Fossil for Bob Morris (1965) is a quintessential example of the artist's approach of blending traditional materials with everyday objects. It is composed of printed paper fragments on a stretched canvas covered with an acrylic sheet, constructed moveable elements, and various objects made of metal, rubber, plastic, and cloth that have been fastened with metal hardware. The piece is one of three works dedicated to collaborators with whom the artist was associated in the Judson Dance Theater. The objectâ€™s age, layered and complex structure, and variable configurations for display through moveable elements raised various questions regarding its preservation. It therefore requires substantial research into its condition and possible treatment, a project supported by a generous grant from Bank of America to the Hirshhorn Museum and Sculpture Garden. Primary sources, specialized literature, and the Rauschenberg Research Project at the San Francisco Museum of Modern Art will be used to inform history, provenance, and the artist's body of work. In addition, the project will explore the materiality of the work through extensive research into materials and construction. Broader questions related to the impact of rapidly degrading materials, and artistic philosophy on decision-making regarding interventions and preventive measures, will be addressed and include the input of various stakeholders. This paper presents the outcome of this multidisciplinary investigation, increasing scholarship related to the work of the artist, and aims to contribute to the ongoing discussion on the varied approaches to the conservation of complex works of contemporary art.

The Conservation Project that Ushered a Pivital, yet Neglected, Female Artist into the Museum Spotlight

Samantha Sheesley

History is being re-written to include critical artists that have been forgotten over time. Conservators play an important role in the resurrection of neglected objects representing such visionaries. Sari Dienes is an unsung, yet pivotal, female artist of the 20th century. She countered self-expressive Abstract Expressionism with an images of found objects. Working in an uninhibited nature, she unrolled a medical material called Webril onto the streets of New York City and transferred the textures of manhole covers and subway grates with an inked brayer. Many artists were greatly inspired by Dienes. Despite her impact museums did not invest in her work. However, friends of Dienes recognized her significance and conceived the Sari Dienes Foundation. There her artwork, materials, and archives are housed with the best of intentions. Unfortunately, many of Dienesâ€™ most important pieces have deteriorated and become too fragile to be considered for acquisition or exhibition by many institutions. The Virginia Museum of Fine Arts recently acquired two rubbings by Sari Dienes. Sadly, both pieces suffered numerous condition problems rendering them unfit for exhibition. These pieces were not acquired in spite of their condition, but because the museum hoped to right certain wrongs of time. The novelty, scale, and fragility of the objects demanded innovation. A collaboration between Samantha Sheesley, VMFA Paper Conservator, Sarah Eckhardt, VMFA Curator, and Barbara Pollitt, Curator of the Sari Dienes Foundation, identified key questions. The pooled information guided stabilization and compensation efforts culminating in the display of objects previously thought to be unsalvageable.

Using Photogrammetry in Outdoor Sculpture Conservation: Assessing Jean Dubuffet's Jardin d'email

Alice Watkins
Co-authors: Sanneke Stigter, Susanne Kensche, Jitte Waagen, Tijm Lanjouw

This research evaluates the use of innovative imaging technologies, photogrammetry and image-based 3D modelling, to aid the conservation of the large-scale contemporary outdoor sculpture, Jardin d'email (1974) by Jean Dubuffet (1901-1985) owned by the Kröller-Müller Museum. It specifically analyses the effectiveness of using 3D models of the sculpture and its scale-model to inform the treatment process of repainting the intended design. This research was done at the initiative of the museum during the current on-going conservation treatment of the sculpture, led by its senior conservator for sculpture and modern art. Through this project, original hand-painted markings were uncovered that were hidden by overpaint. Being 600m2, Jardin d'email is one of the largest outdoor hand-painted sculptures in Europe, which visitors can enter and walk on. Due to this interactive feature and exposure to the outdoor environment the work has a known history of overpainting. Photogrammetry is used as a practical tool to document the original markings, prior to repainting the sculpture based on the design of Dubuffet's 1:10 scale-model. It is explored how 3D models of the sculpture and scale-model can be used to improve the accuracy of the repainting process. Using photogrammetry in conservation shows promising results. It involves a cross-disciplinary collaboration between contemporary art conservators and digital archaeologists, supported by information from other sources. The artistic design of hand-painted sculpture is difficult to reconstruct, but the use of 3D models alongside information from interviews with stakeholders of the artwork, allows the sculpture to portray Dubuffet's vision.

Documentation
Meeting Room 3a, 11.20 – 12.40
Chair: Siobhan Stevenson ACR

A workflow for publishing Linked Data for conservation documentation. A case study from Oxford Museums and Libraries

Athanasios Velios
Co-authors: Nicole Gilroy ACR, Alexandra Greathead

Linked Data is a set of technologies which allow large scale integration of datasets. With the term 'integration' we refer to the process which results in a unified and distributed dataset that enables querying data from different systems jointly. A cornerstone of such process is an 'ontology': a formalised document which describes the discourse in a domain through basic concepts and relationships of concepts. In 2017 Oxford University ran a pilot project to assess the potential of Linked Data for integrating datasets from Oxford collections. The Oxford datasets included data from conservation studios at the Bodleian Library and the Ashmolean Museum. In this paper we present a workflow for transforming existing conservation data from different sources into Linked Data. Our workflow is system independent and accommodates different levels of data quality. We address issues about the technical publication of conservation terminology for Linked Data applications with particular emphasis in Universal Resource Identifiers (URIs). We discuss frequent characteristics of conservation data and how these are expressed using a heritage ontology: the CIDOC-CRM. We continue with observations around enriching conservation data. We conclude with an assessment of the benefits of Linked Data integration in conservation, including the new knowledge that can be extracted from integrated data, the shift from documenting records of single objects to documenting collections and the evaluation of treatments in conservation in the same fashion as clinical studies. The paper will be illustrated with examples from Oxford datasets and a demo system querying integrated data.

Connecting the Dots - Part 1: Mapping Conservation Documentation Using Knowledge Graphs

Ana Tam

Conservation documentation in of itself is an invaluable resource for scholarship and is integral to our professional standards and best practice. However, fragmented resource materials and a lack of conservation data standards were identified in the 2016 report commissioned by the Foundation for the American Institute for Conservation of Historic and Artistic Works (FAIC) as key challenges for the conservation profession working in the contemporary digital world. Graph theory is the area of mathematics that studies the interconnectedness of things. Graphs, in this sense, are made up of nodes and edges where the node is a piece of data and the edge is the relationship between two nodes. This resulting diagrammatic model has also been called a Spider Map or Knowledge Map and serves as the fundamental basis for graph databases. Mapping information using graphs is a recognised standard for presenting information on the Semantic Web and is used in diverse fields from bioinformatics (to encode and model life science data) to investigative journalism (to track the flow of offshore funds). The use of graphs in information management has become widespread due to its flexibility to handle structured and unstructured (or schema-free) data. This paper will introduce graphs and present the results of a literature review demonstrating how they can be utilised to map and model conservation knowledge and how this can help tackle the persistent problems around conservation documentation, such as its fragmentation and inaccessible isolation. It will also discuss the implications this may have on conservation workflows.

Smartsourced Conservation: Overcoming the Limitations of Smartphone Technologies

Laura Chaillie

The potential of smartphones has inspired a huge volume of optimistic discourse in the academic literature of a broad range of disciplines. Except, that is, heritage conservation. Why this disparity? Are smartphones simply ill-suited to conservation activities? This dearth is indicative of either an industry-wide reluctance or some barrier inherent in the technology itself, but given conservation's willingness to adapt new tools and all available resources, the latter seems much more probable. Despite some publicized one-off projects (which have been almost entirely abandoned), the widespread adoption of smartphones in conservation is stymied by both 'hard' and 'soft' components. Mobile handsets are composite objects that consist of numerous independent devices manufactured under a heavy cloak of industry secrecy. Furthermore, mobile software is a state of constant flux as developers attempt to stay current and compatible with the full range of new systems. All this fluidity means that broad stroke recommendations are virtually impossible. However, this does not completely preclude the use of smartphones in heritage conservation, it merely requires that we resituate our understanding of what kind of tool a smartphone is. This short presentation will outline the inherent limitations which are currently preventing a unilateral set of recommendations for the use of smartphones in various heritage activities before suggesting a new approach to resolve many of these challenges. In this model, a mobile handset is not only a tool to be wielded, it is a ubiquitous platform that enables a large number of people to work collectively. Such an intervention is illustrated with a case study.

Ethnography
Meeting Room 2a, 11.20 – 12.40
Chair: Charlotte Ridley

Conserving World Cultures for Medicine Galleries

Adriana Francescutto Miro, Marisa Kalvins

The new Medicine Galleries in the Science Museum has offered us the opportunity to research, document and conserve many ethnographic objects. These are found throughout the exhibition, with one section, Faith, Hope & Fear, focusing on the relationship between folkloric faith and medicine. We discuss the challenges posed by these objects: mounting, display and treatment issues. Our approaches involved considerations regarding materials, techniques and object information. Ethnographic objects due for display originate from Asia, Africa, Oceania, Americas and Europe. Those with challenges included a collection of holy water bottles (from the rivers Jordan and Ganges, the Dead Sea and locations in France and the US), a baby carrier from Sioux people, a Sri Lankan mask and various amulets. A baby carrier made by Sioux people posed conservation challenges because of the unstable basketry which had multiple broken and missing canes. Research of materials and techniques was necessary to develop an ethical treatment and establish the level of intervention required. Holy water bottles with handwritten ink labels posed a dilemma on whether these should be displayed with their original labels or if a methodology could be established to safely place facsimiles over these to prevent the chemical deterioration of the paper and ink, and the potential loss of information, due to light radiation. The ethnographic objects have provided unique considerations different from the rest of the medical collection, requiring us to prioritise conservation treatments that allow us to maintain and interpret the historical, spiritual and aesthetical values of the objects.

Conservation of Uvol headdresses, the Horniman Museum and Gardens

Misa Tamura ACR

The Horniman Museum's new permanent World Gallery opened its doors to the public in June 2018. Among the 3,500 objects conserved for the project were three headdresses from Uvol people, Papua New Guinea. Before acquisition by the museum the headdresses were used in ceremonies during the 1980s. As the headdresses were prepared for display, significant physical damage to both objects, compromising their overall structure, was identified. Their structure was constructed using pith, an extremely light-weight, soft and spongy tissue obtained from vascular plants. Whilst its lightness and flexibility would have been advantageous for use in a headdress, the material is extremely vulnerable to impact damage. Numerous breakage and loss areas made the objects too unstable for the type of handling necessitated by their install and display. This paper aims to discuss the challenges providing the object with a structural fill and joins that are of compatible weight to the original pith material, yet with sufficient strength and adhesiveness to support the loss areas as well as the overall structure. Due to the nature of the material it was not possible to apply pressure to the repaired areas. However, many damaged areas had been sprung off their original alignment, necessitating the use of directional force to support and hold the overall structure. With existing, published case studies relatively sparse in the realm of Ethnographic conservation, it is hoped that this case study will serve as a platform to initiate a discussion about the conservation of pith materials found in three-dimensional artefacts.

Conservation Challenges when Conserving the Ephemeral: The Conservation of a 7'Rambaramp Mortuary Statue, from Vanuatu circa 1920s for the Museum of Archaeology and Anthropology Cambridge University

Karen Horton

Rambaramps are ancestral effigy of a prominent male, composed of the over-modelled human skull of the deceased which is attached to a bamboo framework covered with tree fern and a clay like paste made of plant fibre on which are painted body designs of high status. The head and face are fashioned to create a portrait of the individual in life complete with spiders web hair measuring 1 meter in length, the proportions of the arms and legs were determined by the bones of the deceased. The figure wears a belt and penis cover made from Banana? fibre. And 27 pigs tusks and turtle shell armlets on his arms, as well as the elaborate shoulder projections of four modelled human heads with pigs tusks protruding from each mouth. Rambaramp's resided in the men's meeting room where they would stand until they decomposed. This Rambaramp is the only one that exists within the UK. The effigy had suffered severe damage, one arm had broken away, and the hands were broken. The clay paste was cracked with flaking pigment and the fibre belt and penis cover were delaminating. An innovative method of internal attachment was designed using Rare Earth Magnets encased in a cage of Varaforma-thermo plastic resin sheet chosen for its light weight and mouldability, lasacux adhesive tulle was used to consolidated the banana fibre belt.

Having It Large 2
Meeting Room 1a, 11.20 – 12.40
Chair: Brian Hall ACR

Armed for Success: A new strategy for English Heritage's Artillery Collection

Bethan Stanley ACR

Over the past decade English Heritage has grappled with the challenge of implementing an effective conservation programme for its artillery collection. A key issue is the aggressive environments they are subjected to as well as the huge variety and geographical spread from Tudor cannon in Northumberland to WWII anti-aircraft guns in Cornwall. With responsibility for the care of artillery moving to the conservation team, a new five year national maintenance and conservation plan has been implemented. The strategy takes account of the condition, material and location of guns and varies the frequency and level of treatment to improve the overall condition of the collection to achieve less than 5% in unstable condition within the next five years. Predominantly these unstable objects are the more complex 20th Century guns, constructed from more vulnerable materials and in some cases still in firing condition. Experience and research has already guided changes to improve methods of gun conservation but there are aspects that still need further research. Having reached the first step - knowing what we don't know - research is focused on aspects such as coating performance of commercial paint systems, waxes and oils and finding better materials and designs for external gun covers and progress in defining this will be summarised. Crucially although initial research is carried out by the conservation science team this is supplemented by practical application in the field to assess performance and usability in a real life situation; 20th century guns situated in aggressive coastal environments.

Blue light laser scanning for documenting surface alteration in medieval sculpture

Christopher Weeks ACR

One of the greatest legacies of Viking settlement on the Isle of Man is a corpus of over two hundred memorials and markers, carved in stone of local origin, the decoration of which ranges from simple incised crosses to complex interlace and depictions of Christian and Scandinavian themes. These 'Manx crosses' are dispersed across the island in the Manx Museum, churches, churchyards and even fields. Manx National Heritage, the island's national heritage agency, and legal guardian of the Manx crosses, is engaged in an ambitious multidisciplinary project to improve their interpretation and conservation, and access to them. An effective means of recording the surface topography was required to gauge the rate of decay and plan conservation measures. A Faro Edge Arm blue light laser scanner enabled the capture of dark, shiny surfaces at the very high resolution required. Scanning all two hundred and ten crosses was a major undertaking involving the creation of very large data files each with several billion points. The work was undertaken by Lancaster University and Archaeovision. In future the completed point clouds will be superposed upon more recent scans to identify any losses or deformations that may have occurred. Finally, in collaboration with our IT partners Knowledge Integration and Gooii, Manx National Heritage is also using these data to render and publish relatively small photo-textured models of every cross in Mimsy XG and on 3D sharing website Sketchfab, simultaneously.

Value and risk in the running of historic military tanks

Luca Hoare

Co- authors: Nicola Emmerson, David Watkinson

Historic military tanks, dating from WWI to the recent past, form the basis of the collection at The Tank Museum, Bovington. The majority are on static display or in storage but a small number are maintained in working order and are run in hugely popular displays for the public. Maintenance of running vehicles necessarily involves repair and replacement of original parts. Wear, tear and loss of historic materials must be accepted in the decision to display tanks in this way. How can this be reconciled with conservation ethics demanding preservation in perpetuity? This research examines the essence of historic tanks and the experience of a tank in motion with associated sights, sounds and smells. Visitor opinion is surveyed and commentary on the relative values of experiencing tanks in motion and static is derived from feedback. Contemporary reports of tanks in military action lend weight to an argument that the essence of these vehicles is lost if the mechanisms of shock and awe, motion and sound, are lost to static display. Preserving the material then comes at the price of losing the essential properties of these dynamic objects. The paper presents results of visitor surveys and historical research to challenge a central tenet of conservation and collections care practice. The visitor experience and the understanding and educational value that is derived from a 'risky' display approach is at the core of this debate.

Heritage Science 3
Meeting Room 2b, 11.20 – 12.40
Chair: Dr Eleanor Schofield

Spectroscopic Studies of Organic Artefacts from the Mary Rose

Lianne Jordan
Co-authors: Johanna Sandström, Giannantonio Cibin, Alan Chadwick, Anita Quye, Eleanor Schofield, Serena Corr

The Mary Rose is a Tudor warship, which sank in 1545 off the south coast of England. It was raised in 1982 along with over 19,000 artefacts. In marine archaeological wood, one of the major degradation pathways is through sulfur species, mainly sulfate salts and sulfuric acid (which hydrolyses cellulose). Iron from ship fixtures and other artefacts further catalyses this process. A conservation treatment that neutralises sulfuric acid and removes iron sulfate is essential to prevent further degradation of organic-based artefacts from the ship. In this work, SrCO3 cellulose patches were applied to iron sulfate soaked oak cubes. After removal, the patches and the wood were analysed by S and Fe K-edge X-ray Absorption Near Edge Structure (XANES), FTIR, Raman, and portable XRF spectroscopy. These preliminary experiments reveal that SrCO3 cellulose patches have the potential to be useful spot conservation treatments for marine archaeological wood by removing sulfur and iron species. Degradation occurs through complicated and unique pathways for each artefact and needs to be explored in greater depth. This project encompasses the characterisation of rope, wool, leather, and sail cloth from the Mary Rose as well as reference fibres for comparison purposes using optical microscopy, portable XRF, and polarised ATR-FTIR. Through fibre identification, investigating factors causing deterioration, and the extent of degradation, this project will lead to a greater understanding of the ship's organic artefacts. This will influence the development of specific conservation treatments and has further-reaching implications for the conservation of marine archaeological organic materials in general.

Simulation modelling: A learning laboratory for preservation management support

Cristina Duran Casablancas
Co-authors: Matija Strlič, Gerrit de Bruin, Gabriëlle Beentjes, Jaap van der Burg, Josep Grau-Bové

We are developing a mathematical model and simulation tool to show quantitatively the effect of preservation options during the lifetime of archival and library collections, regarding preservation, access and costs. The aim is to support collection-managers with the complex decision-making process of collection management. Therefore, we use modelling and simulation paradigms of complex systems. In our model, the system includes inputs related to preservation but also to other functions that are closely linked to preservation (e.g. acquisition, access and use), and complexity arises from the interactions between the parts of the system where cause and effect are distant in time, and long and short term effects usually differ from each other. In this paper we discuss the underlying potential as well as challenges of the use of complex systems approaches in the heritage field. We discuss three aspects that we have identified as key in the use of systems modelling in heritage: the importance of capturing the heterogeneity of the collections; the use of disparate data sources (from damage-functions to figures on energy consumption or number of requests in the reading room); and dealing with uncertainty when reliable data is missing. We also examine the importance of simulation as a learning laboratory to explore what-if scenarios. For example, we explore at what point digitization (short-term decisions) will substantially reduce the accumulation of wear and tear (long-term effect); or what is the effect of postponing decisions (e.g. deacidification or decreasing T and RH in the repositories) regarding preservation, access and costs.

Searching for Rock Art at Stonehenge using Artificial Intelligence

Gavin Leong
Co-authors: Dr Matthew Brolly

Although Stonehenge is one of the most important prehistoric monuments in Britain, roughly a quarter of its above-ground stone surfaces have never been studied. These surfaces are inaccessible to conventional surface scanners due to the dense coverage of lichen on the stones. 71 prehistoric axe-head carvings, important to archaeologists for understanding the values and rituals of the Early Bronze Age, were recently found on the bare rock surface. Hence, more of such carvings may lie undiscovered beneath the surfaces obscured by lichen. We present our work on the development of a versatile and non-destructive technique for visualising subsurface features beneath a noisy outer layer using only surface imaging methods. We achieve this using photogrammetry and pattern recognition algorithms from machine learning. Photographs of axe-head carvings at Stonehenge, taken using a general purpose DSLR camera, are processed into 3-D models using open-source structure from motion photogrammetry. Deep learning, a subfield of machine learning, then allows us to digitally generate more axe-head carvings with variations in shape and depth. We simulate the species of lichens found at Stonehenge and layer them on our artificially-generated axe-head carvings. A supervised learning algorithm is then trained on these iterations to differentiate between lichen surfaces with and without carvings beneath. This is then applied on real images of lichen covered surfaces at Stonehenge to find obscured axe-head carvings. For archaeologists and heritage scientists, this is a cheap and versatile method of identifying the shape and location of, and digitally preserving any rock carvings obscured by lichen.

Historic Interiors
Meeting Room 2b, 11.20 – 12.40
Chair: Rosie Shaw

Banqueting House: How do you monitor a monumental ceiling like Rubens?

Jonathan Bridal ACR and Victoria Richards ACR
Co-authors: Martin Hancock and Kathryn Hallett ACR

Banqueting House is a Grade I listed building of international significance dating from 1621. Designed by Inigo Jones, it contains the only in-situ ceiling painting scheme (installed 1636) by Sir Peter Paul Rubens. In 1999, Historic Royal Palaces started monitoring the relative humidity (RH) and temperature in locations on the front and reverse of the canvas, along with other locations throughout the building. This environmental monitoring (Hanwell) system allowed continuous monitoring with telemetrically transmitted data. However, with the ceiling at 17 meters from floor level, the RH sensors were not physically accessible to facilitate regular recalibration. The roof space void above the ceiling contains asbestos (ACMs) and is a fragile structure, making access equally impractical within H&S regulations. A bespoke Hanwell Solutions software device is now installed that negates the need for physical access. Thermistors (temperature probes) that do not need recalibration over a long time period have been introduced into the difficult to access locations. Two reference RH/temperature sensors are placed in nearby, more easily accessible locations, where they can be regularly recalibrated. These provide information from which the partial vapour pressure is calculated. These values are derived from the calculated saturation vapour pressure at that temperature, multiplied by the measured RH. In this way, each temperature probe location in the ceiling is given a calculated RH as well as a temperature value. This method has many other potential applications for continuous monitoring in other hard to access historic interiors.

Authenticity - the pursuit of shifting sands: the development of thinking on colour matching over the last 20 years

Helen Hughes ACR

Dictionaries define 'shifting sands' as a situation that changes so often that it is difficult to deal with, or a situation that changes very often in an unmanageable way. Paint and dyes begin to change from the moment they are applied and then alter at different rates. Conservators are often challenged to recreate the original authentic appearance of an object - often multicoloured. This paper makes use of published discussions on the tricky problem of establishing the original appearance of colour, carried out over the last thirty years - not only to track the development of conservation thinking on this subject but to understand broader shifts in conservation attitudes and beliefs. In the late 20th century the resistance to embracing the subjectivity of conservation decisions was often masked by the deployment of an array of scientific techniques to 'establish the truth'. A colour spectrometer may be used to match the colour of the dead daffodil but it will never provide the spectral reflectance curve of the fresh daffodil. It just took a while to admit this. Today's dialogue on the subject focuses on teamwork, collaboration, reviews and adjustments. The recreation of a historic colour or scheme is now viewed as a research experiment or trial an approximation of what it may have been. The research is no less rigorous but the context is more honest.

A new way of looking! How architectural paint analysis contributes to a new methodology for material culture research

Meredith Freeman

Architectural paint research (APR) contributes to understanding cultural built heritage through materials identification, practice-informed knowledge and contextualising this information with other material culture evidence. tResearchers usually think of theory, method and methodology as sequential steps. However, in material culture studies the tionship between materiality and society is multifaceted incorporating empirical evidence from technical analysis with experiential learning from reflective practice. Incorporating a 'bottom-up' practical component, based on the explicit and implicit information of an object, complements and balances the 'top-down' paradigmatic component and is one strategy to link theory and method. APR is an example of a middle-range interpretive methodology that effectively blends theory, method, and data without forcing them to conform to each other. APR has the ability to contribute to the theory concerned with the material aspects of social reproduction and associated research methods suitable for negotiating the agency, materiality and related human context of material culture. This allows researchers to adopt an object-centred focus, where materiality dictates the research methods, based on empirical information, object narrative and value. This paper uses case studies to explore how APR as a methodological framework enables materiality of historic buildings to drive research, yielding information on the building, its social and cultural context, and significantly contributing to heritage studies.

New Conservator 2
Meeting Room 3b, 11.20 – 12.40
Chair: Julia Jablonska

A nudge in the right direction: effective training for the time poor

Sarah Hamlyn ACR, Nicole Monjeau

As working lives become increasingly busy, finding time to organise and attend training sessions can be difficult. In a library where the biggest risks to collections come from use, it is crucial to keep collection care in people's minds so risks can be recognised and addressed. To tackle this challenge, appropriate training is required and this training must be relevant, timely and delivered in an engaging and direct way. We have to be able to balance the knowledge we have with the need to transfer key information in a relatable way. Keeping qualitative, as well as quantitative, data about training sessions ensures an understanding of the topics and activities that resonate most with participants. By understanding that people learn in different ways and may prefer different types of training delivery, we can shape our training sessions to be both innovative and useful. This provides an opportunity to create multifaceted training, combining instruction, practical exercises and self-learning modules, while inviting discussion and feedback to gauge understanding. This approach allows a balance between tasks which require greater initial input but provide long-term benefits, and those which can be delivered quickly in response to immediate needs. Relevant training can then be provided more easily at regular intervals in order to keep collection care on the agenda. This paper will discuss examples of this approach for two distinct sets of learners with differing training needs: collection storage and reading room staff, and the Collection Salvage Team.

SWANS: Developing Partnerships and Cascading Expertise in a Challenging Environment

Helena Jaeschke ACR
Co-authors: Vic Harding, Roz Bonnet

Background: South West Museum Development (SWMD) supports 218 museums in the Accreditation scheme. Most have natural science objects; at least 39 have significant collections, yet only 4 museums have paid natural science staff and posts are declining. Many are volunteer led, with small budgets and limited experience or knowledge to look after natural science collections. The project: Responding to this growing challenge, Bristol Culture and SWMD launched SWANS (South West Area of Natural Science) Collections Project in 2015, supported by the John Ellerman Foundation, to increase the skills of remaining specialist staff and respond to the needs of the museums across the region. The project included skills-mapping, introductory and in-depth training sessions and site visits, with on-going support. The resources developed for the training form the basis for a core Handbook for non-specialists, with short videos of specific techniques which will be freely available through the SWMD website. The paper: The paper will address 3 main topics:

- The development of the partnership between museum development, subject specialist networks and the museum community, working to create a sustainable model.

- The experience of helping museums to develop the confidence to unlock the potential of their important collections and increase the scientific content of their displays.

- The delicate balance between enabling others and defining safe limits: assessing risk of damage and loss to collections in their existing conditions compared to the risk of inappropriate interventions.

Podcasting Conservators: The story so far

Kloe Rumsey, Jenny Mathiasson
Co-author: Christina Rozeik ACR

We launched The C Word: The Conservators' Podcast in April 2017 because we felt that there was a need for a podcast that discusses issues from the perspective of conservation professionals, from museum trends and new technology to the big issues like pay and staying safe at work. The podcast is now in its fourth season and has reached a wide listenership in the UK and abroad, with nearly 50,000 downloads to date. This season has seen even more progress with extensive community engagement and international collaborators. Our goals are still the same as at the start, however: to discuss, inform, and provide a platform for conservators around the country (and now the world) to share their challenges and their successes. Our paper will deal with the journey so far, including the ups (and downs), the unexpected, and the wonderful. We will also ask our audience questions like: How can social media and new media better serve conservation? How do we see interaction between conservators working in the future? How can podcasts and livestreams be used for teaching, advocacy, and outreach? To deliver this session we hope to divide the time between traditional presentation and audience contribution through answers to our questions. The goal will be to live broadcast the presentation as episode 8 of season 5, making it available to conservation professionals around the world.

Plenary Session 3
Great Hall, 13.40 – 15.00
Chair: Siobhan Stevenson ACR

Shining a light on the emerging conservator: Challenges facing the future generation

Arianne Panton and Rebecca Plumbe

The Icon Emerging Professionals Network (EPN) was established in 2018 in response to a need for greater representation within Icon of emerging conservation professionals, regarded as students and those in the first few years of their career. This network follows a growing global trend within the profession of similar platforms offering support, advice and networking opportunities to early career conservators. Of the many networks, a few examples include the American Institute of Conservation's Emerging Conservation Professionals Network, Facebook groups such as the Canadian Association for Conservation of Cultural Property's Emerging Professionals, and graduate blog posts linked to the University of Lincoln and University College London's Conservation Departments. In addition to this, specialist journals and conferences have also been established to provide a platform for emerging conservators to share their research and experiences. These platforms demonstrate the need and importance within the industry to give emerging conservators a voice. With this in mind, when establishing the network we asked emerging conservators to complete a short survey to identify their main concerns and support needs. The results of this survey will be discussed in this presentation. Topics such as post-graduate opportunities, continued professional development and access to real-world experiences will be discussed, touching on personal case studies to illustrate the various concerns and challenges highlighted. Overall this presentation aims to stem productive discussion between all members of our profession to address some of the issues and restrictions facing the emerging professional today.

Forging ways forward through the fear factor

Leanne Tonkin

Lack of diversity, ambition and evolving cultural leaders are identified as common challenges within the conservation field. Efforts are made through specialist publications, presentations and social media to 'out' these challenges, but what does a paper referring to diversity in conservation actually look like? The formal definition of 'diversity' means 'a range of different things'. Conservators demonstrate their wide-ranging specialist skills when negotiating treatment strategies, environmental protocols and engaging with the public sphere, yet they seem professionally distant from diverse personalities from different backgrounds and, perhaps, different perspectives of how and why to conserve cultural heritage. This paper is a personal trajectory reflecting on the successes and challenges of my changing role as a textile conservator from a working-class background in the UK. I will reconnect with personal experiences working as a conservator in both the UK and the USA. I will begin by explaining what drew me towards textile conservation from a commercial fashion design background. Discussion will lead onto my observations and reflections as a practitioner in the field of textile conservation and, on returning to the UK, the limitations of pursuing practicing conservation. The paper will conclude that there is a need for different perspectives in conservators reaching senior management level to dispel the fear, resentment and discouragement of conservators being driven and ambitious. This means a call to expand management skills to enable the profession to thrive and promote the next generational conservation thinkers who will represent 'a range of different things'.

Who do we exclude when we keep things for the future?

Jane Henderson ACR

Who do we exclude when we keep things for the future? Collections can be vulnerable, conceptual or consume themselves, there is no ethical requirement to keep things as long as possible. We do have a duty to offer informed relevant and precise advice about the consequences of activities, and help deliver the activities with the minimum unnecessary negative consequences. But that is not the same as saying longer we have it the better. My challenge for the ICON conference is for conservators to express the 'use it and enjoy it' narrative confidently without undermining their other messages. When we talk about keeping things, so we can share benefits with the future what is the implied cultural assumption? Unless we change drastically users of the future will look a lot like users of today, white privileged, educated, western, well-resourced and able bodied. When we try to keep things as long as possible are there unintended barriers? Managing light privileges those with good vision, the young and able bodied, setting humidity targets for loans privileges those with building equipment, revenue and moderate climate. Consulting and sharing with desirable stakeholder privileges those already with access to cultural heritage. Exclusion has real consequences and is a risk that should be in our equations. Conservators think a great deal about the costs and not enough about benefits. Some things cannot survive for long, why aren't we arguing to use it, touch it squeeze it now while we can? Conservators need to know when to assert 'lets enjoy it now' and ask 'what memory of it can we keep afterwards'?

Plenary Session 4
Great Hall, 15.30 – 17.30
Chair: David Leigh ACR

Conservation for mission: an evaluation of the Church of England's conservation grants programmes

Janet Berry ACR

The Church of England's fabric repairs and conservation of historic interiors grants programmes grant aid over Â£600,000 to around 150 Anglican parish church projects per year. The grants programmes aim to help parishes to conserve their church heritage. An independent evaluation of the grants programmes is currently being undertaken, with the aim to evaluate the impact of our grants programmes. This presentation will discuss the results of the evaluation and assess the impact of conservation work on churches. The evaluation is assessing how the programmes are meeting their aims, the impact of our funding on the physical conservation of the churches and their historic interiors, and the social impact on the parishes and wider communities. The geographical and socio-economic reach of our grants will be assessed, the effect that this may have on conservation work, and what happens to projects, and objects, when grant applications are unsuccessful. We are interested in whether grant awards incentivise good conservation practice, and whether the introduction of grants for initial conservation reports increases the success rate of subsequent conservation applications. The results from the evaluation will inform our future fundraising and grant giving strategies, and also feed into the wider picture of conservation provision in England.

Matching Practice with Purpose: Challenges of conservation within a diverse collection

Siobhan Stevenson ACR

The collections at National Museums Northern Ireland are among the most diverse to be found in any museum. They range from insects to steam engines, artworks to archaeology and exhibit buildings to sound archives. The paper will explore the diversity of the collections and the challenges inherent in providing a consistent and considered approach to conservation and collections care. Identifying the purpose and intent behind the use of collections, and the way in which they are acquired, interpreted and displayed, is an intrinsic part of the conservation process. Approaches to care, conservation and restoration across disciplines can vary, with accepted practices in one subject area at odds with approaches within another. Conservation practice needs to negotiate the many and complex needs of users, whether they are other professionals, visitors or enthusiasts while championing the intrinsic value of the object. This should be tailored to individual collection items to best support continued appreciation of their cultural and historical significance. Using a wealth of examples of projects in support of different exhibition techniques, including working collections and display of exhibit buildings and their collections, this paper will vividly illustrate many of the dilemmas faced. It will look at some of the assumptions inherent in conservation practice and explore the tensions between museum practice, user experience and ethical frameworks in a cross disciplinary context. In turn this will provide some ideas for how new ways of thinking and structuring decision making in conservation can provide a fresh perspective which compliments contemporary museum practice.

Eight Days a Week: Lessons Learned Worldwide in Public Outreach, Advocacy, Partnerships, and Fundraising

Debra Hess Norris

For forty years, I have had the privilege to lead with others photographic preservation initiatives from Beirut to Bogota, Benin to Beijing. I have been surrounded by images that connect and celebrate humanity. As an educator, I have worked to advance and strengthen photograph conservation education and training globally. As nations struggle with increasingly catastrophic natural disasters, armed conflict economic collapse, and other crises, the need to preserve our world's heritage, including our treasured photographs, is heightened. During this presentation - and with music - I will share lessons learned as an educator, fundraiser, and advocate from the Hill in Washington DC to the TEDx public stage and other venues. We must connect our preservation initiatives to reconciliation, energy, environment and economic development, collaborate with established regional partners and not operate in isolation, build visibility through marketing and social media, establish short-and long-term and practical implementation plans, communicate repeatedly and effectively; promote respect, harness passion and creativity, and take risks. As conservators we have the responsibility to engage with allied professionals, decision makers and the public, and to serve as global ambassadors. Effective collaborative partnerships and external funding are essential. Funding proposals should be well integrated and project monies' secured via effective advocacy and networking from individuals, foundations, corporations, and government agencies - must be invested wisely to ensure sustainability. As we build core competencies in the examination, documentation, treatment, and care of cultural heritage, our future success will be determined by our collective interpersonal, communication, advocacy, engagement, and fundraising skills.

Breakout Sessions

DAY 1 – Lunchtime

Meeting Room 1a: Emerging Professionals Network Panel Discussion Libby Ireland, Alyssa Singh, Charlotte Tomlin, Sarah Peek, Sarah Morton.

The Icon Emerging Professionals Network Panel Discussion will be a chance to discuss some of the topics raised during the New Conservators session in more depth. Focusing on entering the job market and access to professional development, we will bring together four conservators to engage in a lively debate around the issues and opportunities facing early-career conservators. We are excited to welcome Sarah Peek, Aly Singh, Sarah Morton and Charlotte Tomlin to the panel for what we hope will be positive and constructive discussion.

Meeting Room 2a: PACR Drop In Patrick Whife, Icon Training and Development Manager

An informal drop in session for those who wish to find out more about Icon Accreditation and ask any burning questions to help you on your route towards accreditation.

Meeting Room 3a: CXD – Premiere screening of the film CXD Paper Trail: A Walk Through the Mill

Please join us on Friday lunch for the premier screening of the film "CXD Paper Trail: A Walk Through the Mill". Let us transport you to the Lake District to better understand where and how our paper is produced.

DAY 1 – Afternoon Break

Meeting Room 1a: Practical Poster Demonstrations

DAY 2 – Morning Break

Meet the Scotland Group!

The Icon Scotland group will be holding an informal drop-in session for conference delegates to meet committee members and hear what the Icon Scotland group gets up to. You don't have to be working in Scotland to come along, as you may still be interested in attending our events or delivering collaborative events with us.

DAY 2 – Lunchtime Break

Meeting Room 1a: Leadership Skills for Conservators Julie Bon ACR, Claire Magill ACR and Bridget Mitchell

Julie Bon ACR, Claire Magill ACR and Bridget Mitchell ACR undertook the Leadership Launchpad Mastermind Programme in 2018. Over lunch they will share their experiences from the programme and to answer any questions you have. They will discuss how the programme has supported them in developing their leadership skills, the importance of leadership for conservators and how a focussed effort on their own professional development has already begun support them in their career development.

Meeting Room 2a: PACR Drop In Patrick Whife, Icon Training and Development Manager

An informal drop in session for those who wish to find out more about Icon Accreditation and ask any burning questions to help you on your route towards accreditation.

Meeting Room 3a: Intern Lunch

All current and former Icon Interns have the opportunity to meet over lunch. Icon's intern advisors will be there. This is a great opportunity to meet and network with Icon Interns past and present.

Demonstrations in the Mobile Heritage Lab

The Mobile Heritage Lab is a unique research facility. It is a vehicle that enables heritage science projects across the UK. It is also "open access": anyone (museums, communities, individuals) can apply to use it for relevant research or public engagement projects. It contains cutting-edge equipment for scientific analysis of heritage: a hyperspectral imaging system, ground penetrating radar, a 3D microscope, and is packed with environmental sensors. It is a project of UCL, the University of Oxford and the University of Brighton, and is funded by EPSRC.

Testing the Oddy Test Aditi Nagar Thursday 13th and Friday 14th June, morning break

Used in museums worldwide, the Oddy test is one of the most well-known techniques in preventive conservation. In this activity Aditi Nagar will demonstrate some of the scientific techniques that can be used to study the performance of the test, and perhaps improve it. This involves some of the key techniques in preventive conservation research: volatile emission testing, accelerated ageing and environmental monitoring. This research has been supported by #Icon19 Champion Sponsors Conservation by Design.

Machine learning to visualise historic artefacts Gavin Leong Thursday 13th and Friday 14th June, lunchtime break

Gavin Leong will talk about how the 3-D reconstruction and visualization has been used to reveal prehistoric carvings on Stonehenge. Covered by lichen, the carvings are not visible using conventional imaging techniques. Only combining machine learning with photogrammetry and laser scans, the lichen can be "digitally removed" in order to identify the underlying shapes. The activity will involve a demonstration of how machine learning combined with 3D visualisation can be used to automatically recognise characters.

Participatory Research using the Mobile Heritage Lab Josep Grau Thursday 13th and Friday 14th June, afternoon break

The mobile lab is an infrastructure for research and for public engagement, and often for both at once. This activity will demonstrate some of the most interesting results obtained through participatory science. Research with the Mobile Lab has demonstrated, for example, that pictures taken with hundreds of mobile phones can be as precise as professional colorimeters. In collaboration with Historic Environment Scotland, we are exploring how many other measurements can be taken in collaboration with visitors.

POSTERS
Exhibition Hall

Adèle Wright, Lynne Harrison
Think again: adapting current conservation methods to solve an old problem on a fragile canvas mural painting by MacDonald Gill

Alex Walton
Remote Dynamic Object Control & Monitoring System

Ann-Marie Miller
Developing New Techniques for the Repair of Parchment Bindings – Case Studies and Ethical Considerations

Arielle Juler
Preventive Conservation at the National Trust for Scotland

Bethan Bryan
The Ethics of Dust: Westminster Hall - Assessing the storage and display needs of a latex artwork

Bhavesh Shah
Using data science to produce the V&A environmental report

Chloe Pearce
Optimising Storage Conditions of Archaeological Bone: Identifying and Refining Methods

David Mills
Maximal Intervention: Extreme solutions to vinegar syndrome

Donald Sale
Investigating glass transition behaviour of butyl methacrylate resins using Nano Thermal Analysis

Elena Iurovetskaia
Interdisciplinary Conservation Project - Painting Apotheosis of Anna Ioannovna created by an unknown artist in mixed technique

Elizabeth Palacios
Beyond hand skills: Approach about what influence conservation practice in Peruvian cultural sector scenario

Erica Read, Arianna Bernucci
Textured fur and feather fills using Japanese tissues and natural dyes

Francois Duboisset
Conservation of rubber

Gwen Spicer
Resiliency and the Triboelectric Series: Some physics every conservator needs to know

Hana Bristow
Conservation of a WWII ASDIC dome at the National Museum of the Royal Navy (NMRN)

Helen Smith
Light maps & loggers: new approaches to light management in Tate's galleries

Belfast by night. Photo: Belfast City Council

Helen Wilson, Arantza Dobbels
The changing colour, opacity, and chemical composition of model transparent paper

Julia Poirier
Conserving a 12th century Palm Leaf Manuscript: Contemporary Treatments and Ethical Considerations

Kayleigh Spring
Using 3D design and printing to produce replica parts for the Kings Fund hospital model

Kiri Douglas, Sophie Coulthard
Introduction to Nanocellulose - a conservator's guide

Lauren Osmond, Jill Plitnikas
Towards the Reconstruction of an Archaeological Cork Helmet: Reducing Deteriorated Polyethylene glycol and Glycerol Using Gellan Gum

Lisa O'Hagan, Hilary Jarvis, Nigel Blades, Sarah McGrady
Comparing the effect of mesh blinds and traditional Scottish Holland blinds on the distribution of daylight in historic showrooms

Loredana Mannina, Libby Ireland
Loss compensation of textured modern materials: Trials in the use of composite fills

Lydia, Amies, Efstratia Verveniotou, Amy Scott-Murray
The Conservation of Gough's Cave Ivory: A minimal Approach with Great Impact

Maria Ledinskaya
Using decision-making models in conservation of contemporary sculpture: Slate Bust by Dan Harvey

Marina Kruger Pelissari
Green Solvents

Melissa Daugherty, Klaas Jan van den Berg, Maarten van Bommel, Saskia van Oudheusden
Diagnostic Strategies for Assessing the Cleaning of Paintings. Results from the EU IPERION-CH project

Nigel Blades, Katy Lithgow, John Mardaljevic, Stephen Cannon-Brookes, Lisa O'Hagan
Climate based daylight modelling to understand and manage daylight in historic house showrooms

Paul Garside, Karen Bradford
Measuring Dust Accumulation - Comparing Qualitative and Quantitative Assessments

Sarah Bertalan
The Effect of Non-fiber Additives on Function, Appearance and Condition: Lessons Learned Treating Modern Paper

Suzanne Reid, Karen Dundass
The Conservation and Recreation of Holmwood House Original Wall Decorations

Tania Desloge, Lucia N. Melita
The application of Er:YAG laser on epoxy resin and treatment of an 18th century Tahitian mourner's pearl shell headdress

Kim Verkens
Preventive conservation of plastics in textile collections

Zoe Reid
From medieval historians to hi-tech virtual reality, unwrapping the past - Conservation of archives saved after the 1922 fire in the Public Record Office of Ireland

Thanks

We couldn't have done it all without the generous support of our sponsors.

Champion Sponsor

CXD INTERNATIONAL CONSERVATION BY DESIGN

Partner

TRU VUE

Supporter

meaco measurement and control

Supporter

Willard Conservation Equipment Engineers

Special thanks to

Caroline Checkley-Scott, Emma Murphy, Carolyn Hays, Samantha Greatbatch, Paul Willard, Heather Page

Conference Committee

Programme Committee

Leanne Tonkin, Chair
Mark Furness
Sarah Glenn
Brian Hall
Annette King
Ellie Schofield
Aly Singh
Victoria Stevens

Project Committee

Michael Nelles, Project Manager
Susan Bradshaw
Fiona Brandt
Joey Charisi
Cynthia Inesta
Patrick Whife

Tour Providers

Ruth Bothwell
Claire Magill ACR
Dr Andrew Molloy
Dave Orr ACR
Dawson Stelfox MBE
Siobhan Stevenson ACR

Print Materials Editor

Michael Nelles

Graphic Design

Paul Skipp, Greenapple Graphics

CXD INTERNATIONAL
CONSERVATION BY DESIGN

BY APPOINTMENT
TO HER MAJESTY QUEEN ELIZABETH II
SUPPLIERS OF CONSERVATION STORAGE,
EQUIPMENT AND DISPLAY PRODUCTS
CONSERVATION BY DESIGN LIMITED
BEDFORD

© Andy Wright, Cumbria Archive Service

Contemporary thinking and practice in conservation, and changing standards in the sector leaves the conservator with the challenge of balancing the needs of the object, cost and concerns for the environment.

Did you know green EcopHant™ millboard is made from the recycled waste from our grey Premier Duo™ boxboard? The image above shows the Cumbria Archive Service combining the use of both box styles.

As we move towards a more passive environmental management of our museum and archive storage, let us help you create the right solution.

PROUD CHAMPION SPONSOR of ICON 2019 Belfast
THE INSTITUTE OF CONSERVATION

CARE • CONSERVE • CREATE

BOXES & STORAGE PRODUCTS
PAPER, BOARDS & MATERIALS
CONSERVATION EQUIPMENT & ACCESSORIES
STORAGE & WORKSHOP FURNITURE
MUSEUM SHOWCASES & MOUNT MAKING

Conservation By Design Limited, Timecare Works, 2 Wolseley Road, Bedford, MK42 7AD, United Kingdom
+44 (0)1234 846300 info@cxdinternational.com **www.cxdinternational.com**