British Museum Conference and Workshops on APACHE Project & Nano-Systems

Research and Applications on Cultural Heritage

Date: (Tue) 4 and (Wed) 5 June 2019
Venue: Sloane Room and WCEC at the British Museum

Introduction

We have, with great generosity, been offered a conference/workshop on two EU projects: Nano-system (including **Nanorestart**) (for the conservation cleaning of painted surfaces using nano-gels) and **APACHE** (Active & intelligent Packaging materials and display cases for preventive conservation of Cultural Heritage). Specialists involved in the Nanorestart Project (Dr. Piero Baglioni and Dr. Gabriella Di Carlo from the Research Centre for Colloid and Surface Science in Florence, and paper conservator Dr. Antonio Mirabile) have agreed to come and present their innovative work. For more information about the project and their work with the Tate, see https://www.youtube.com/watch?v=8zCzIyN2QW8.

The Morning session on Day 1will give an overview of the **APACHE** project. The talks have been designed around three main research orientations: modelling, novel materials and dissemination strategy. This session on is open to a wide audience including conservators, curators, collection care managers, registrars, and scientists.

The Afternoon Session on Day 1, open to a conservation and science audience, will explore the **Nanorestart** project, the world of nano-science & nano-materials applied to the conservation of cultural heritage (including the removal of tapes and surface coatings). The lectures and presentations will explain the theoretical, research and implementation aspects of nano-materials

On Day 2 the practical workshops will enable conservators to apply methods and materials. The morning session, open to 24 conservators, is more general. The afternoon sessions will be more specific, looking at and experimenting with nano-systems for the treatment of objects made from organic and inorganic materials.

Megumi and Barbara
18/04/2019

British Museum Conference: APACHE Project

Active & intelligent packaging materials and display cases as a tool for preventive conservation of Cultural Heritage

Date: (Tue) 4 June 2019
Venue: Sloane Room at the British Museum

The APACHE Project

The EU funded APACHE project (which recently started in January 2019) will develop active novel packaging materials, based on materials modelling with sensors and wireless sensor technologies (WST), that will provide smart, easy-to-deploy systems for storage and exhibition of artefacts.

One of the main goals is to dramatically reduce the costs of mechanical climate control and monitoring systems by refining and customising these smart, affordable new materials. The current, expensive Passive Sampling Devices and monitoring systems are often cumbersome to calibrate and fail to deliver the correct sensing in a timely manner.

Programme

Time	Speaker	Title	Room / Capacity
DAY 1: (Tue) 4 June 2019			
APACHE Project: Active & intelligent packaging materials and display cases as a tool for preventive conservation of Cultural Heritage Chair: Sandra Smith (Head of Collection Care)			
10:00-10:40	**Piero Baglioni**	APACHE project, general overview	This session is open to a wide audience including conservators, curators, collection care managers, registrars, scientists. Sloane Room
10:40-11:10	**Josep Grau-Bove** (UCL London)	APACHE project Modelling enclosure microenvironments	
11:10-11:30	Coffee Break		
11:30-12:00	**Gabriella di Carlo**	APACHE project Absorbents and sensors	
12:00-12:30	**Antonio Mirabile**	APACHE project Training plan and transfer to stakeholders	
12:30-13:00	**Discussion and Questions [an invited chair will field questions]**		
13:00-14:00	Lunch		

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement n° 814496

Speakers: APACHE Project

Dr Piero Baglioni is full professor of Physical Chemistry at the Department of Chemistry of the University of Florence, and MIT affiliate. He has been appointed as Visiting Scientist/Professor by the Department of Chemistry of the University of Houston, the Weizmann Institute, the College de France, and the MIT. He is the Director of the National Consortium for Colloid and Nanoscience (CSGI). He is the major Italian contributor to "Soft Matter" with more than 350 publications on books and on largely diffused international journals. He is also the author of 25 patents. He produced several innovations in the field of both inorganic and organic colloids.

Dr Gabriella Di Carlo is Researcher at CNR-ISMN and her main research interests include synthesis and surface studies of advanced materials with tailored nano-chemical, structural and morphological features to be used for sensors, delivery e micro-electronic devices. Another field of interest is the identification of the degradation causes acting at micro and nano-scale in order to define the most appropriate conservation strategies. She works on the synthesis and validation of innovative materials with stimuli responsive properties for a long-lasting and safe conservation of metals. She has authored about 70 publications on international ISI journals with an H index of 24 (Google Scholar).

Antonio Mirabile began his career in 1988, he is a paper conservator and a consultant in preventive conservation. He studied Book and Paper conservation in Florence, Italy, and Preventive Conservation in Paris, France, where he actually lives. In France he is accredited by French Ministry of Culture to conserve and restore the cultural heritage belonging to the Musées de France. He works regularly for public and private collections. As UNESCO expert he worked in various paper conservation and preventive conservation projects. As partner of EU funded project Nanorestart he is involved in the scientific identification of dyed-based inks used in contemporary drawings, in the development of innovative methods in order to improve conservation treatments and in the transfer of novel materials and methods to conservators.. He is the author and co-author of about 50 articles and wrote two handbooks published by UNESCO. He is an active member of INCCA, ICOM and the Blue Shield.

Dr Josep Grau-Bove is an engineer by training, PhD in Heritage Science. He is a lecturer in the UCL Institute for Sustainable Heritage where he directs the MRes in Science and Engineering in Arts, Heritage and Archaeology. His main research interest is the use of mathematical models in preventive conservation, in order to understand how materials and the environment interact. He is also working on heritage citizen science, developing ways in which the public can help with data collection.

British Museum Conference and Workshops on Nano-Systems

Research and Applications on Cultural Heritage

Date: (Wed) 5 June 2019

Venue: WCEC at the British Museum

Nano-Science and Nano-Materials (e.g. The Nanorestart project)

Nano-materials exhibit characteristics that are peculiar and different than those of other bulk materials, offering enhanced chemical, electrical, magnetic and optical properties that are advantageous in a range of applications. The "Nano-science revolution" began forty years ago and has now led to the creation and development of entirely new technologies thanks to the formulation of smart and functionalized materials that often exploit the ability of matter to self-assemble. Nano-materials applied to the world of conservation of cultural heritage is offering us significant benefits from new materials and products.

Programme

Time	Speaker	Title	Room / Capacity
DAY 1: (Tue) 4 June 2019			
Nano-Systems Research and Applications to Cultural Heritage Chair: Carl Heron (Director of Scientific Research)			
14:00-14:30	**Piero Baglioni**	Nano-science and its contribution to the conservation of Cultural Heritage	This session can be opened to a wide audience, and will interest conservators and scientists. Sloane Room
14:30-15:30	**Piero Baglioni**	Nano-Gels, emulsions and nanomaterials: theoretical aspects	
15:30-15:50	Coffee Break		
15:50-16:40	**Gabriella di Carlo**	Innovative protective materials for the conservation of metal works of art	
16:40-17:30	**Antonio Mirabile**	The use of Nano-systems in the conservation of cellulose-based artworks. Case studies.	
17:30-18:00	**Discussion and Questions [an invited chair will field questions]**		
DAY 2: (Wed) 5 June 2019			
Practical workshops on Nano-Materials			
09:00-12:30	**Piero, Baglioni, Gabriella di Carlo and Antonio Mirabile**	Innovative materials for cleaning, consolidating and protecting works of art: a practical introduction and demonstration on the use, reuse, recycling and handling of the novel materials.	Max. 24 conservators [Organics studio or Atrium Level 6]
Coffee break somewhere in the middle of this session.			
12:30-14:00	Lunch		
14:00-17:30 These sessions run in parallel.	**Piero Baglioni and Antonio Mirabile**	Testing and experimenting nanomaterials, on mock-ups or expendable case studies on organic materials such as paper, leather, wood….	Max 15 conservators (Organics studio)
	Gabriella di Carlo	Application of innovative protective materials from non-toxic solvents for the conservation of copper and silver alloys.	Max. 9 conservators (CGM studio)
Coffee break somewhere in the middle of this session.			

Speakers: Nano-Science and Nano-Materials

Dr Piero Baglioni is full professor of Physical Chemistry at the Department of Chemistry of the University of Florence, and MIT affiliate. He has been appointed as Visiting Scientist/Professor by the Department of Chemistry of the University of Houston, the Weizmann Institute, the College de France, and the MIT. He is the Director of the National Consortium for Colloid and Nanoscience (CSGI). He is the major Italian contributor to "Soft Matter" with more than 350 publications on books and on largely diffused international journals. He is also the author of 25 patents. He produced several innovations in the field of both inorganic and organic colloids.

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Examples of nano-technologies applies to artworks, wall-paintings and metals

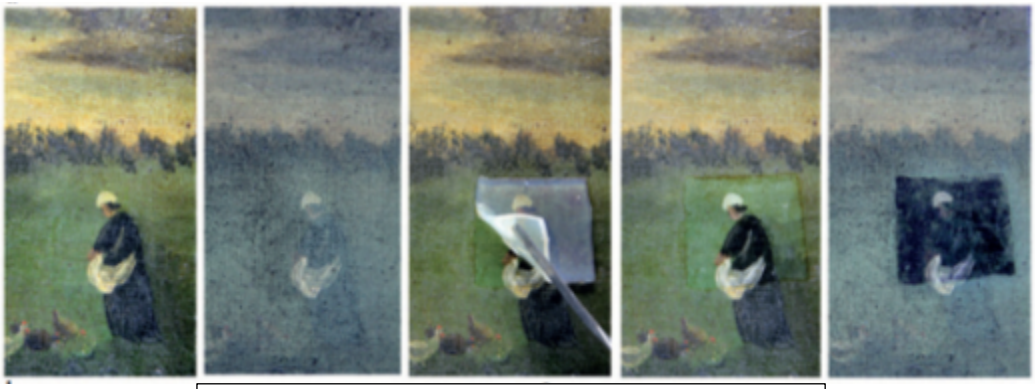
Sixteenth century drawing
from *Ascesa dei Beati,* Sistine Chapel
Before and after treatments

Benelli, et al, *Restoration of paper artworks with microemulsions confined in hydrogels for safe and efficient removal of adhesive tapes*, PANAS Latest Article, 2018

F. Fellini
Anniversary: "14 May 1957 – 14 May 1987", 1987
Before and after treatments

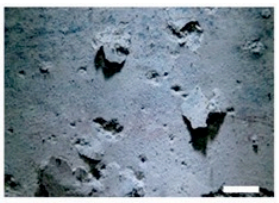
Travace, et al, *An Innovative Method to remove PST from Contemporary Felt-tip Pen and Ballpoint Pen Drawings on Paper*, 2017

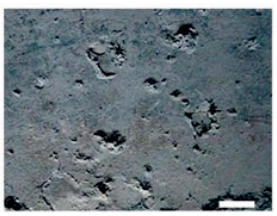
Removal of aged varnish from an eighteenth-century canvas painting
From left to right: the painting before cleaning (visible light); the painting before cleaning (UV); the application of the hydrogel (visible light); the painting after cleaning (visible light); and the painting after cleaning (UV).



Baglioni, et al, *Nanomaterials in Conservation*, Nature Nanotechnology, April 2015

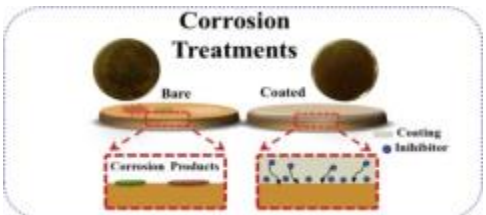
Maya wall paintings in Calakmul, Mexico
(L) The wall paintings after restoration with nanoparticle dispersions, (RT) the detaching paint flakes before the application of nanoparticles, and (RB) re-attached and re-adhered paint flakes after the application of nanoparticles.





Baglioni, et al, *Nanomaterials in Conservation*, Nature Nanotechnology, April 2015

Application of chitosan-based coatings embedding different corrosion inhibitors



Giuliani, et al, *Chitosan-based coatings for corrosion protection of copper-based alloys: A promising more sustainable approach for cultural heritage applications*, 2018