The conservation of modern and contemporary works of art requires advanced solutions at the cutting edge of modern chemistry and material science. The NANORESTART project focuses on the synthesis of novel poly-functional nanomaterials and on the development of highly innovative restoration techniques to address the conservation of a wide variety of materials. The ground-breaking nature of our research can be more easily outlined by focusing on specific issues.

The main conservation challenges that will be addressed in the project are:

Conservation challenge 1
Cleaning of contemporary painted and plastic surfaces (CC1)

Conservation challenge 2
Stabilization of canvases and paintings in contemporary art (CC2)

Conservation challenge 3
Removal of unwanted modern materials (CC3)

Conservation challenge 4
Enhanced protection of artworks in museums and outdoors (CC4)

The NANORESTART project is articulated into eight work-packages (WPs) that will cover 42 months.

WP 2 - New tools for cleaning
Formulation of nanostructured residue-free cleaning fluids, through the use of self-degrading surfactants, new class of gels for the confinement of cleaning systems and new enzyme solutions in highly retentive gels.

WP 3 - Surface strengthening and consolidation
Restoration of the original mechanical properties of works of art using nanocellulose and cellulose derivatives in combination with nanoparticles; development of porous silica particles loaded with plasticizers for restoring the mechanical properties of plastic and paint layers.

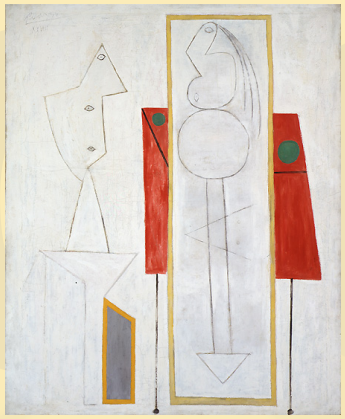
WP 4 - Protection of surfaces
Development of polyfunctional protective systems, which combine "active" and "passive" strategies. "Active" systems are based on green polymeric matrices functionalized with nanomaterials.

WP 5 - Nanostructured substrates for highly sensitive detection
Development of nanostructured substrates and sensors for the enhanced detection of degradation products from modern and contemporary art.

WP6 - Environmental impact assessment
Environmental impact assessment of the most effective and promising technologies developed in WPs 2-5.

ACHIEVEMENTS AT MONTH 24

Pollock and Picasso masterpieces restored



Several **products developed** within NANORESTART are currently being **tested by conservators and restorers** on representative case studies. Among the selected works of art, **outstanding masterpieces** of contemporary and modern art, such as paintings by **Pollock** or **Picasso**, were **successfully restored** using **innovative hydrogels** and **nanostructured fluids** formulated by NANORESTART partners.

10 gels for surface cleaning

Selective removal of unwanted modern materials, such as **adhesives** or **overpaints** due to vandal actions, was performed using **hydrogels loaded with nanostructured fluids** and **organogels**.

12 nanostructured fluids

Innovative **cleavable surfactants** were synthesized, which represent a new class of **spontaneously degradable amphiphiles**. About **12 environmentally friendly nanostructured fluids** were developed for the removal of unwanted materials from artistic surface.

4 systems for fibers consolidation

The use of **cellulose derivatives** in combination with **nanoparticles** could ensure the **consolidation of fiber-based materials**. Several formulation for the **nanorelining** of canvases and for the **single-thread consolidation** of fibers are currently being developed.

6 protective coatings

Polyfunctional protective systems, both **active** (releasing corrosion inhibitors) and **passive** (gas barrier), are being developed for the preservation of **metal artifacts** and **rapid prototyping materials**.

1 disposable sensor

A **disposable electrochemical sensor** was developed for convenient detection of **gaseous formaldehyde** that is considered as one of the most important indoor pollutants. It can be used as a **marker molecule for material degradation**.

CLP and **ecotoxicity** of developed products were evaluated **following EU safety regulations**.

ART INSTITVTE CHICAGO

Airi ASSOCIAZIONE ITALIANA PER LA RICERCA INDUSTRIALE

AkzoNobel

antonio mirabile

ARKEMA

ACCADEMIA DI BELLE ARTI DI BRERA

DE LA RECHERCHE À L'INDUSTRIE cea

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INSTITUTO DEL PATRIMONIO CULTURAL DE ESPAÑA IPCE

MBN nanomaterialia

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Tyndall National Institute

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USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

UNIVERSITY OF AMSTERDAM

ZFB ZENTRUM FÜR BUCHERHALTUNG

PARTNERS

AT A GLANCE

Title: NANOmaterials for the REStoration of works of ART

Project reference: 646063

Topic: NMP-21-2014 - Materials-based solutions for protection or preservation of European cultural heritage

Call for Proposal: H2020-NMP-2014-two-stage

Total cost: EUR 9 178 647,25

EU Contribution: EUR 7 918 397

Duration: 42 months

Start Date: 2015-06-01

Consortium: 27 partners from 12 countries

Project Coordinator: CSGI - Consorzio Interuniversitario per lo Sviluppo dei Sistemi a Grande Interfase (Firenze, IT)

www.nanorestart.eu

Horizon 2020
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for Research & Innovation

Nanomaterials for the Restoration of Works of Art