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Ca' Foscari University of Venice

Politecnico di Milano

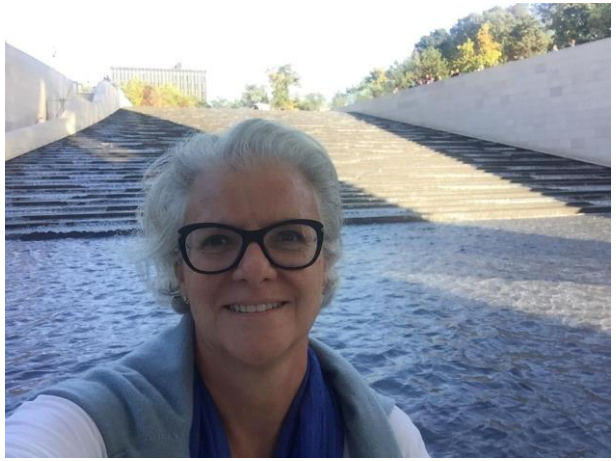
Dipartimento di Chimica e Materiali e Ingegneria Chimica *«Giulio Natta»*

Università Ca' Foscari di Venezia

Dipartimento di Scienze Ambientali, Informatica e Statistica

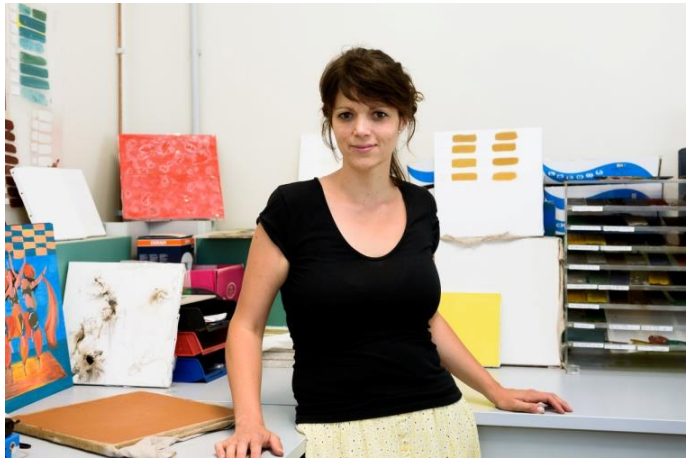
Coordinatore di unità: **Prof. Lucia Toniolo** (Politecnico di Milano)
lucia.toniolo@polimi.it

PoliMi e Unive Research Unit



Prof. Lucia Toniolo (PoliMi)
Unit coordinator
lucia.toniolo@polimi.it

Prof. Sara Goidanich (PoliMi)
sara.goidanich@polimi.it



Dr.PhD. Francesca Caterina Izzo (Unive)
Fra.izzo@unive.it

Unit objectives

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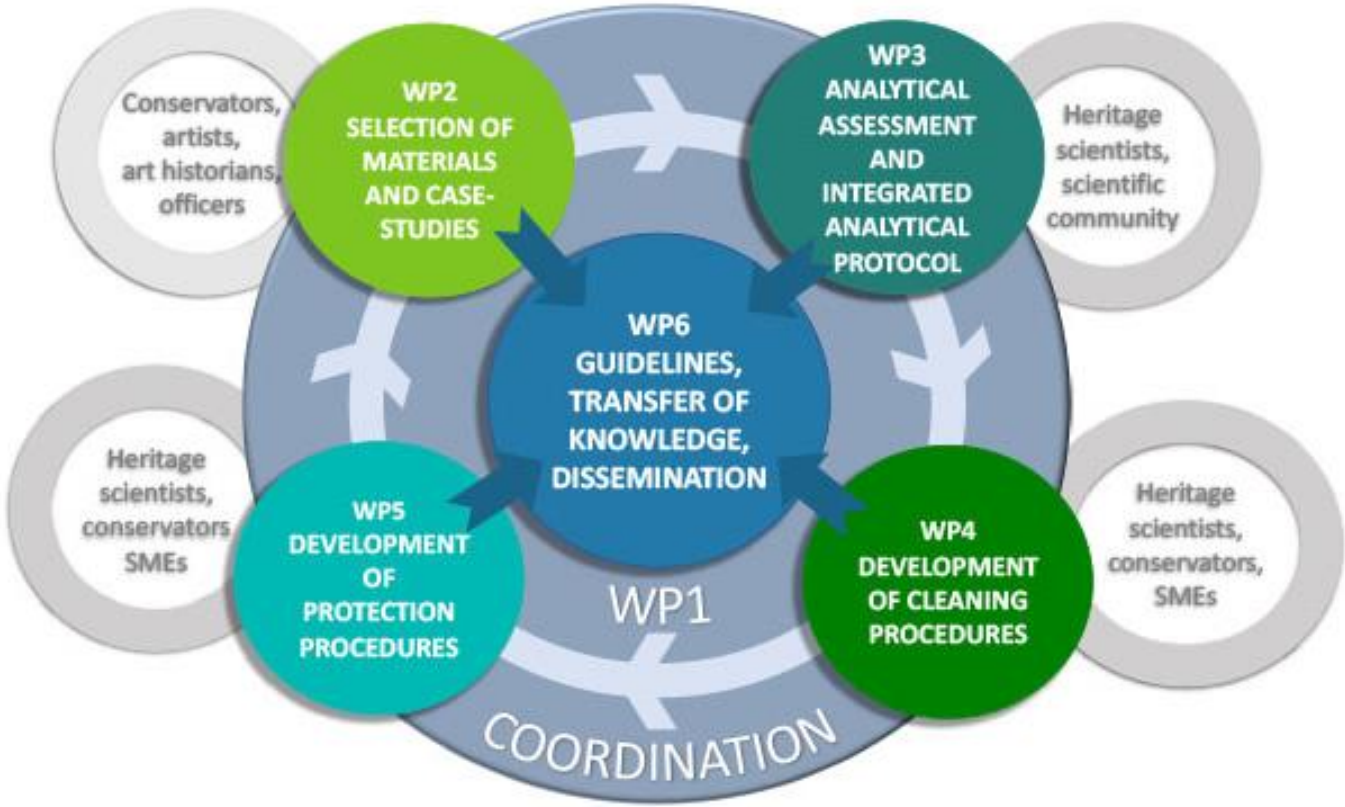
- Identification of case-studies (**WP2**)
- Set-up of lab and on-site testing and ageing protocols (**WP2**)

- Development of protection procedures (**WP5**), with particular attention to: compatibility and durability of protective systems;
- On-site application and assessment of protective systems (**WP5**)

- Development of preservation guidelines (**WP6**)



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WP5 DEVELOPMENT OF PROTECTION PROCEDURES

Facilities

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- µFourier-Transform Infrared Spectrometer (FT-IR) with ATR accessory
- Portable FT-IR
- Micro-Raman spectrometer
- Portable Raman
- Hyperspectral camera (350-1000 nm and 350-2500 nm)
- FORS spectroradiometer (350-2500 nm)
- Thermogravimetric analyser (TG) -Differential Scanning Calorimeter (DSC)
- Gas chromatograph - mass spectrometry (GC-MS) with analytical pyrolysis and Evolved gas analysis
- High-performance liquid chromatography (HPLC-ESI-Q-ToF)
- Optical Contact Angle (OCA)
- Stereo and optical microscope
- Scanning Electron Microscope (SEM/EDX)
- Climate chamber
- Rain Chamber
- Solar box

Tools to evaluate the efficacy, compatibility and reversibility of protective systems both in laboratory and in situ
Chambers for the accelerated ageing and study of durability of protective systems

(recent) Publications

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- Izzo, Francesca Caterina; Kratter, Matilde; Nevin, Austin; Zendri, Elisabetta *A Critical Review on the Analysis of Metal Soaps in Oil Paintings* in CHEMISTRYOPEN, vol. 10, pp. 904-921-921 (ISSN 2191-1363) 2021
- Roveri Marco, Goidanich Sara, Dotelli Giovanni, Toniolo Lucia, *Semi-empirical models to describe the absorption of liquid water in natural stones employed in built heritage before and after the application of water repellent treatments*, CONSTRUCTION AND BUILDING MATERIALS, 241, 117918, pp. 1-14, 2020 https://doi.org/10.1016/j.conbuildmat.2019.117918
- Roveri Marco, Goidanich Sara, Toniolo Lucia, *Artificial ageing of photocatalytic nanocomposites for the protection of natural stones*, COATINGS, 10, 729, pp 1-16, 2020 doi:10.3390/coatings10080729
- Ghirardello Marta, Valentini Gainluca, Toniolo Lucia, Alberti Roberto, Gironda Michele, Comelli Daniela, Photoluminescence imaging of modern paintings: there is plenty of information at the microsecond timescale, MICROCHEMICAL JOURNAL, 154, 104618, 2020, https://doi.org/10.1016/j.microc.2020.104618
- Izzo, Francesca Caterina; Balliana, Eleonora; Perra, Emanuela; Zendri, Elisabetta *Accelerated Ageing Procedures to Assess the Stability of an Unconventional Acrylic-Wax Polymeric Emulsion for Contemporary Art* in POLYMERS, vol. 12, pp. 1-23 (ISSN 2073-4360) 2020
- Carava S.; Roldan Garcia C.; Vazquez de Agredos-Pascual M.L.; Murcia Mascaros S.; Izzo F.C. *Investigation of modern oil paints through a physico-chemical integrated approach. Emblematic cases from Valencia, Spain* in SPECTROCHIMICA ACTA. PART A, MOLECULAR AND BIOMOLECULAR SPECTROSCOPY, vol. 240, pp. 118633 (ISSN 1386-1425) 2020
- L. Fuster-López, F. C. Izzo, C. K. Andersen, A. Murray, A. Vila, M. Picollo, L. Stefani, R. Jiménez & E. Aguado-Guardiola *Picasso's 1917 paint materials and their influence on the condition of four paintings* in SN APPLIED SCIENCES, vol. 2 (ISSN 2523-3963) 2020
- Simona Raneri, Alessandra Giannoncelli, Elisabeth Mascha, Lucia Toniolo, Marco Roveri, Andrea Lazzeri Maria BeatriceColtelli, LucaPanariello, Marco Lezzerini, Johannes Weber, *Inspecting adhesion and cohesion of protectives and consolidants in sandstones of architectural heritage by X-ray microscopy methods*, MATERIALS CHARACTERISATION, 156, 109853, 2019, https://doi.org/10.1016/j.matchar.2019.109853

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Selected Previous Projects

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- **2020-2023:** "Metal Ion Migration Mechanisms In Oil Paints Drying And Degradation (MIMO)" Project (PID 2019-106616GB-100) founded by Programa Estatal De Fomento De La Investigación Científica Y Técnica De Excelencia - Subprograma Estatal De Generación De Conocimiento- Ministerio De Economia Y Competitividad, Spagna
- **2016-2019**: "ProMeSA-Study of the mechanical and dimensional properties of commercially manufactured paint films and their influence in the physical and chemical degradation of modern and contemporary paintings" - HAR2016-75131-P (2016-2019) 20th Century oil paints Project – Modern Paints
- **2019** Raffaello's cartoon "the School of Athens" funded by Pinacoteca Ambrosiana, Milan, Italy; scientific responsible for the mechanical testing of the lining system for the new installation and exposition.
- **2017-2018** project "Luini in nuova Luce" non invasive investigation of Luini's paintings; funded by Cariplo Foundation and Pinacoteca Ambrosiana, Milan
- **2015-2018:** EU-Horizon 2020 Nano-Catheral Project Grant Agreem. n. 646178 Nano-structured materials for Stones
- **2015-2016 :** Statsbygg, Oslo (Norway) "The Oslo Opera House – Condition Analysis and proposal for cleaning, protection and maintenance of exterior marble"
- **2014-2015** Italian Lombardy Region Call POR-FESR 2007-13 – Competitiveness, Axe 1. Line 1.1.1.1 Action E. ID 40393840 Title "Smart Culture" Development of innovative multi-digital model integrated with a non-invasive diagnostics tool.
- **2009-2012**: "ELAICH- Educational Linkage Approach in Cultural Heritage" ENPI 150583 founded by Euromed Cultural Heritage IV Programme