



Cultural Heritage Identity Card


## *Alma Mater Studiorum* Università di Bologna (UNIBO) Italy



Steering Committee Member  
Rocco Mazzeo






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## Basic Facts

- The University of Bologna (*Alma Mater Studiorum*) is recognised as the oldest university in the western world.
- Organised as a multi-campus structure with 5 operating branches (Bologna, Cesena, Forlì, Ravenna and Rimini).
- More than 100.000 enrolled students, 23 faculties, 69 departments, 3000 academics and 3000 administrative staff.
- 14 Ph.D. Schools, more than 300 graduate-level programs for 1800 PhD students.

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## Basic Facts


- It ranks second in Italy for competitive research funding from the Italian Government and has also participated in more than 150 EU projects in both FP5 and FP6.
- The scientific research in conservation of cultural heritage is an integral part of the University and is recognised through the recent establishment of an Integrated Research Team:

ALMA HERITAGESCIENCE




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INTEGRATED  
RESEARCH TEAM

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ALMA  
HERITAGESCIENCE

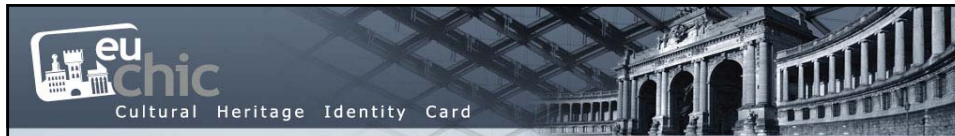



### Science & Technology for Cultural Heritage

Conservation Ethics and History  
Diagnostics and Monitoring  
Surveying  
Environment and Energy  
Constituent Materials  
Restoration materials and methods  
Structural Issues  
Territorial Aspects  
BioArchaeology & BioTechnologies  
Documentation/cataloguing (ICT based)  
Management





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**INTEGRATED RESEARCH TEAM**

**ALMA HERITAGESCIENCE**

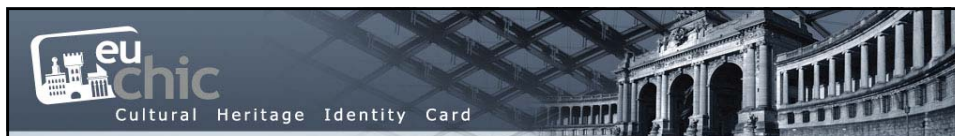



The first aim of the **Integrated Research Team** is to provide a unique interface towards National and International Research Programmes and different Stakeholders in the CH field

**64 Professors, Researchers, PhD, Technicians belonging to 18 Departments**




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**INTEGRATED RESEARCH TEAM**

**ALMA HERITAGESCIENCE**



**Equipment / Labs**

<p><b>Microscopy and microanalysis</b></p> <ul style="list-style-type: none"> <li>• Extended Pressure Scanning Electron Microscopy (EP SEM) with EDS and Raman microscope</li> <li>• Atomic Force Microscope (AFM)</li> <li>• Digital video, dark field and polarized Light Optical Microscopy (LOM) and Stereomicroscopy (SM)</li> <li>• Scanning laser microprofilometry FTIR microscopy (ATR, micro-ATR, diamond cell, mapping) and Raman microscopy</li> </ul> <p><b>Phase identification and chemical analysis</b></p> <ul style="list-style-type: none"> <li>• X-Ray Diffractometry (XRD)</li> <li>• Atomic Absorption Spectrophotometry (AAS)</li> <li>• Inductive Coupled Plasma Spectroscopy</li> </ul> <p><b>Electrochemical equipment</b></p> <ul style="list-style-type: none"> <li>• Potentiostat/Galvanostat</li> <li>• Electrochemical Impedance Spectroscopy (EIS)</li> </ul> <p><b>Image Analysis</b></p> <ul style="list-style-type: none"> <li>• Multi-Spectral Scanner Imaging System</li> <li>• Image analysis system for aesthetical and physical slab characterization</li> </ul> <p><b>Mechanical testing:</b></p> <ul style="list-style-type: none"> <li>• Compressive, Tensile, impact, fatigue, superplasticity, hardness/microhardness, friction/wear testing</li> </ul> <p><b>Thermal Methods</b></p> <ul style="list-style-type: none"> <li>• Differential Scanning Calorimetry (DSC)</li> <li>• Thermogravimetry (TG)</li> <li>• Infrared Thermography (IRT)</li> </ul> <p><b>Environmental Analysis</b></p> <ul style="list-style-type: none"> <li>• Gas Chromatography</li> <li>• Particle matter analysis</li> <li>• Spectroscopic analysis</li> </ul> <p><b>Geo-engineering lab</b></p> <ul style="list-style-type: none"> <li>• International standards testing (CEN...)</li> </ul>	<p><b>NMR Equipments</b></p> <ul style="list-style-type: none"> <li>• Portable NMR Relaxometer for in-situ analysis</li> <li>• NMR Tomograph ARTOSCAN (Isotope SpA), for samples up to 12 cm in diameter</li> <li>• Rf coils for large samples, to be used with the console of the portable device and the magnet of the Tomograph</li> <li>• NMR Relaxometers operating at variable Larmor frequency</li> </ul> <p><b>Materials and Decay Characterisation</b></p> <ul style="list-style-type: none"> <li>• X-Ray Digital Radiography (DR)</li> <li>• X-Ray Fluorescence</li> <li>• 3D Computed Tomography (CT)</li> <li>• Wet-Dry ageing device</li> <li>• Chromatographic Techniques (IC, HPLC, PG-CMS)</li> <li>• Microstructural characterization (mercury porosimeter, water/helium pycnometer, permeability equipment, grain size distribution)</li> <li>• On-site diagnostic equipments (concrete testing, ancient timber testing, soaic testing, etc.)</li> <li>• Electric/electrokinetic measurements</li> <li>• Assessment of materials durability: UV rays exposure, abrasion tests, freeze-thaw ageing</li> <li>• On-site moisture measurements</li> </ul> <p><b>Geomatics:</b></p> <ul style="list-style-type: none"> <li>• High precision total stations and levels, equipments for engineering surveying</li> <li>• Photogrammetric instruments: cameras, analytical and digital workstations, plotters</li> <li>• Geodetic dual frequency GPS receivers</li> <li>• Software for GIS, Remote Sensing, Photogrammetry, 3D modelling, Image Processing</li> </ul>
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## Basic Facts

- Activity in CHIC is carried out by researchers coming from two Faculties:
  - **M2ADL: MICROCHEMISTRY AND MICROSCOPY ART DIAGNOSTIC LABORATORY**, Faculty of Natural Science
  - **DISTART: DEPARTMENT OF STRUCTURAL, TRANSPORT, HYDRAULIC, SURVEY AND TERRITORY ENGINEERING**, Engineering Faculty




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## Basic Facts


- M2ADL has acquired a wide experience on studies of polychrome surfaces and bronzes belonging to both important Italian masterpieces (Giotto, Beato Angelico, Palmezzano, Giambologna, Verrocchio) and Far East Asia (Nepal, North Korea, China).
- The department's activities range from consulting and research to professional training as well as the organisation of national and international meetings.








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## Basic Facts

- These scientific investigations are devoted to the **characterization of manufacturing technique and of processes and causes of alteration**, by means of the integrated use of non destructive and micro destructive techniques.
- Studies on conservation treatments performance have been also carried out.


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## Basic Facts

DEPARTMENT  
 STRUCTURAL, TRANSPORT, HYDRAULIC,  
 SURVEY AND TERRITORY ENGINEERING - DISTART

- DISTART performs research and didactic activities in the fields of: structures, hydraulics and hydraulic constructions, surveying & geomatics, road, railways & airport constructions, transportations, geology and geotechnics.

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**Basic Facts**

DEPARTMENT  
STRUCTURAL, TRANSPORT, HYDRAULIC,  
SURVEY AND TERRITORY ENGINEERING - DISTART

- In the Surveying & Geomatics area, DISTART has a complete laboratory with state of-the-art equipment:
  - topographical high precision instruments for engineering surveys
  - digital photogrammetric workstations, scanners, cameras
  - laserscanning
  - satellite surveying
  - satellite remote sensing, numerical cartography and GIS.

supporting different surveying and monitoring applications for movable and immovable Heritage at different scales and by integrated approaches





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**Major relevant references**

- CHARISMA (Cultural Heritage Advanced Research Infrastructures: Synergy for a Multidisciplinary Approach to Conservation/Restoration) FP7
- EPISCON (European PhD in Science for Conservation) 
- EU-ARTECH (Access, Research and Technology for the conservation of the European Cultural Heritage) FP6
- EU ALFA - Guidelines for post Graduated Education and Training in Conservation Science
- Large number of experiences and cases in Italy, Mediterranean area, Near East and Far East

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## Project Team

- **Prof. Rocco Mazzeo:** Associate Professor at the Faculty of Natural Science.
- **Prof. Gabriele Bitelli:** Full Professor at the Engineering Faculty.
- **Prof. Luca Vittuari:** Associate Professor at the Engineering Faculty.
- **Dr. Silvia Prati:** Researcher at the Faculty of Natural Science.




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## Links in benefit of CHIC

- Partnering and other stakeholders which will be suggested for the Advisory Network or on any other way linked or informed about CHIC:
  - CHARISMA Network
  - ICCROM
  - CARTA DEL RISCHIO [Istituto Superiore per la Conservazione e Restauro (former ICR), Rome]
  - Institutions responsible for monument conservation
  - ...






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## Other information

- M2ADL is organizing the 1st International Congress on Chemistry for Cultural Heritage, to be held in Ravenna from 1-3 July, 2010

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*Alma Mater Studiorum*  
Universita di Bologna





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