



Cultural Heritage Identity Card

National Technical University of Athens (NTUA) Greece



Steering Committee Member
Antonia Moropoulou




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Basic Facts

- The National Technical University of Athens - School of Chemical Engineering employs 186 persons of permanent staff (90 teaching & research staff, 26 technical staff, 70 office staff) and has more than 350 doctoral candidates.
- The School consists of the following Departments:
 - *Chemical sciences*
 - *Process analysis and plant design*
 - *Materials science and engineering*
 - *Synthesis & development of industrial processes.*





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Basic Facts

- ❑ The Department of Materials Science & Engineering employs 35 persons of permanent staff (18 teaching & research staff, 4 technical staff, 13 office staff) and has 78 doctoral candidates.
- ❑ The Department of Materials Science & Engineering covers teaching and research on *physical chemistry, corrosion of materials, and the science of inorganic and organic materials*, from the view point of the relation of structure (molecular, crystalline, microstructure) properties and of imposing selected properties.

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Basic Facts

In the Department two laboratories exist:


- ❑ Physical Chemistry & Applied Electrochemistry
- ❑ Materials Science & Engineering

The infrastructure used comprises:

- ❑ In Situ Non - Destructive Methods (Infrared Thermography, Fibre Optics Microscopy, Ultrasonic Testing, Digital Image Processing, Ground Penetrating Radar)
- ❑ Instrumental Methods:
 - i) **Laboratory Scale:** Thermal analysis methods (differential thermal analysis, thermo-gravimetry, differential scanning calorimetry, dynamic mechanical analysis), microstructure and nanostructure analysis methods (mercury intrusion porosimetry, gas sorption - desorption for porous solids, gas permeability of solids, water permeability of solids, digital image processing of micrographs, optical microscopy, stereomicroscopy), instrumental, chemical, physical and physicochemical characterizations (Fourier transform infra-red spectroscopy combined with optical microscopy, conductimetry, grain size distribution, gas chromatography, Raman spectroscopy, X-ray diffraction, hardness testing, viscometers), micro- and nano-mechanical properties and correlation with structure (nano-hardness measurement, micro-hardness measurement).



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- Instrumental Methods:
 - ii) Semi-industrial Scale: Environmental chamber for accelerated ageing tests, environmental chamber for salt decay, laboratory for preparation of restoration mortars, pilot device for the production of poly-acrylonitrile fibers and pilot device for the production of carbon fibers
 - iii) Computational devices and software for simulation and prediction of materials' and nano-materials' properties and structure
 - iv) Devices for electrochemical measurements (galvanic potential, corrosion current)
- Physical
- Computer Lab
- GIS Lab
- Database Development Lab for the Documentation of Cultural Heritage

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Research Team

- Scientific responsible: *Prof. Moropoulou Antonia*
- NTUA research team:
 - *Bakolas Asterios*
 - *Delegou Aikaterini*
 - *Karoglou Maria*
 - *Katsiotis Nikos*
 - *Kiousi Anastasia*
 - *Konstanti Agoritsa*
 - *Labropoulos Kyriakos*
 - *Moundoulas Petros*
 - *Oikonomopoulou Eleni*
 - *Tsilimantou Elissavet*
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Basic Facts

- Areas of expertise of the Research Team for the protection of cultural heritage:
 - *Advanced diagnostics and monitoring of deterioration process in architectural surfaces of historic and traditional buildings*
 - *Environmental impact assessment and mapping on real scale-real time production*
 - *Selection, application and evaluation of proper, effective and compatible conservation materials and techniques for restoration interventions*
 - *Strategic planning of conservation interventions, environmental management for the protection of monuments, complexes and sites, preservation management of monuments, complexes and sites*
- In parallel to the research activities, the Laboratory supports the educational activities of the undergraduate-level courses of the School of Chemical Engineering, and the graduate-level courses of the Interdepartmental Graduate Program "Protection of Monuments" 2nd Direction "Conservation Materials and Interventions". In addition, the Laboratory provides scientific support for various Ph.D. Theses.




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Major relevant references

Selection of NTUA relevant programs linked to the subject of EU-CHIC

- Criteria & methodology for quality control of materials, conservation interventions and restoration of historic materials [Ministry of Culture, 2002 - 2004]
- Recommendations & methodology for editing of museum studies & earthquake protection of exhibits, regarding control of materials and conservation interventions in museums [Ministry of Culture, 2002 - 2004]
- Development, application, standardization and installation of a non destructive control system for preventive conservation and optimization of the lifetime of the railway infrastructure [Attiko Metro Operation Company S.A., 2003 - 2007]
- Decay study and proposal of compatible materials and intervention techniques for the conservation of stone and other elements of the facades of the central building of National Bank of Greece [Bank of Greece, 1994 - 2002]
- Environmental impact assessment from the construction of the underground networks to the walls of the Medieval City of Rhodes [Public enterprise of urban design and housing, 1995 - 1997]
- Integrated Documentation of Venetian walls of the historic city of Heraclion and background of environmental management of the fortress of the historic city [Regional Operational Program of CRETE, 1996-2001]
- Design and planning of materials and conservation interventions of the facades of the historic buildings of the National Bank of Greece [National Bank of Greece, 2000 - 2003]




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- Marine and polluted atmosphere as a decay factor of Mediterranean Basin monuments [ENVIRONMENT, 1992 - 1996]
- Methods for the assessment and prediction of the decay of monuments due to marine environment [ENVIRONMENT, 1995 - 1999]
- "ITECOM: Advanced Study Course on "Innovative technologies and materials for the conservation of Cultural Heritage" [EESD, 2003 - 2007]
- Development of a Quality System Manual, according to ISO 9001, for the management and promotion of the natural and cultural heritage of island Chios' paths [MED-ISOLAE, 2008]
- Development of an Environmental Management System Manual, according to ISO 14001, for the management and promotion of the natural and cultural heritage of island Evias' path Agali canyon - Tsergon ridge [MED-ISOLAE, 2008]
- Diagnostic study and restoration and protection proposal for the protection of the Acropolis of Sarantapicho and Erimokastro - Kallithea Rhodes [Municipality of Kallithea Rhodes, 2008]
- Innovative environmental management and documentation with the use of new technologies for the protection of monuments and sites of historic and physical value in paths of touristic interest (application in path Agali canyon - Tsergon ridge) [Municipality of Dirfys, 2008]
- Innovative environmental management and documentation with the use of new technologies for the protection of monuments and sites of historic and physical value in paths of touristic interest (application in path Agioi Pateres - Nea Moni) [Municipality of Omiroupoli, 2008]

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Links in benefit of CHIC

Proposed Advisory Network & End - Users

- Epsilon International S.A. (*Prof. Marc Bonazountas, Greece*)
- EC Medici Framework (*Prof. Alfredo Ronchi, Italy*)
- Ministry of Culture, Direction of Restoration of Ancient Monuments (*Director Dimosthenis Ziro, Greece*)
- Hellenic Construction Technology Platform (*President Antonia Moropoulou, Greece*)
- Athens Information Technology (*Dr. Lazaros Polymenakos head of the Autonomic & Grid Computing Laboratory*)

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