Materials for Cultural Heritage & Modern Building: MaCHMoB

http://www.machmob.tuc.gr

1. The Lab

The activity of the Laboratory is focused on the study for the characterization, diagnostic, preservation, monitoring and management of the cultural and architectural heritage and modern buildings.

The main research activities are in the areas:

- Study of built heritage, more specifically the **weathering** and **mechanisms** of **stone decay**;
- Technology of **historic mortars**, **pigments** and **ceramics**;
- Development of **eco-friendly** and **energy efficient plasters** for building envelope;
- Development and characterization of novel **nanocomposites** and conservation methodologies based on environmental friendly technological solutions, for the **cleaning**, **consolidation** and surface **protection**;
- **Consultancy activity** to public authorities and private institutions in conservations/restoration plans.

2. Educational activities

Undergraduate courses

- **Decay and Conservation of Monuments and Architectural Surfaces** (ARCH153)

Coordinator and Teacher: Assoc. Prof. Noni Maravelaki

- **Restoration of Existing Envelopes** (ARCH210)

Coordinator: Assoc. Prof. Nikolaos Skoutelis
Teachers: Prof. F.Mallouchou-Tufano, Assoc. Prof. N. Maravelaki, Assist. Prof. Alexios Tzobanakis

- **Protection and Enhancement of Archaeological Sites and Monuments** (ARCH152)

Coordinator: Prof. F. Mallouchou-Tufano
Teachers: Assoc. Prof. Noni Maravelaki, Assist. Prof. M. Stavroulaki

Graduate Courses

- **Environmental Effect on Monuments and Building: Decay Mechanisms and Conservation Techniques** (B2.5-142)

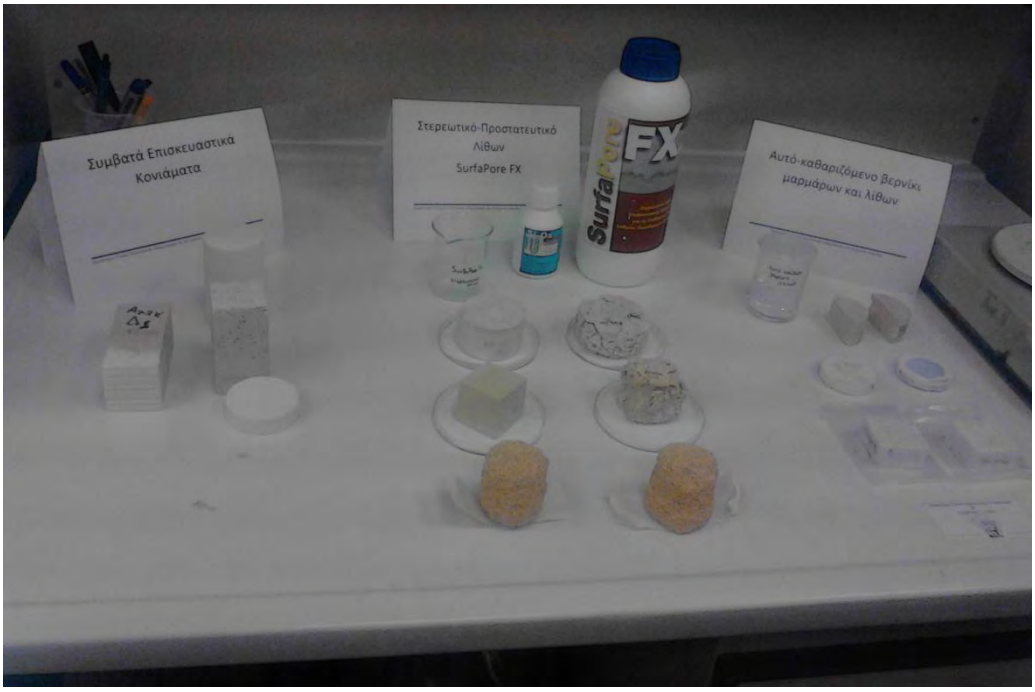
Coordinator and Teacher: Assoc. Prof. Noni Maravelaki

3. Main Research Projects

a) **Hydraulic mortars with nano-titania** addition for the readhesion of fragment porous stones from monuments: Application to the Acropolis, Athens, monuments.

b) A self-cleaning crack-free hydrophobic coating for stone protection
A transparent, hydrophobic, crack-free, self-cleaning TiO_2-SiO_2-PDMS nanocomposite was designed in our lab for application on building materials.

c) A consolidant for strengthening stone and mortars

d) 

We have synthesized a hybrid consolidant which improves the performance characteristics of stones with different porosities. This research activity resulted in the exploitation of the designed nanocomposite by the company NonoPhos for the production scale up of this consolidant (SurfaPore FX: http://nanophos.com/images/SurfaPore_FX_PDS_EN.pdf).

e) THE OSLO OPERA HOUSE (The Opera in Oslo)

- First prize at the contest "**The Oslo Opera House** – *Condition analysis and proposal for protection and maintenance of exterior marble*", organized by Statsbygg, Norway.

- The Oslo Opera House is a listed building of approximately 23 000 m² Carrara Marble that decorates the external facades and roof of the Opera. In this project, Betong Consult AS, NanoPhos SA, the Laboratory Materials and Methods for

Cultural Heritage of the Politecnico di Milano and the Surfa Products Scandinavia AS, also collaborate.

1. People

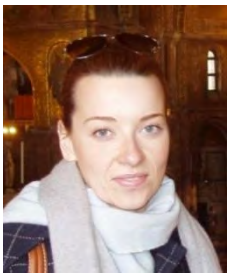
Pagona-Noni Maravelaki, Associate Professor (Head of the MaCHMoB lab)
Office:
Tel. +30 28210 37661
Mob. +30 6973307066
E-mail pmaravelaki@isc.tuc.gr
Profile: https://www.researchgate.net/profile/Pagona_Maravelaki

PDF CV

Post-doc Researchers

Dr. Chrysi Kapridaki (Chemist)
Office:
Tel. +30 28210 37663
Mob. +30 6977486791
E-mail ckapridaki@gmail.com
PDF CV

PhDs



Dr. Anastasia Verganelaki (Chemist)

Tel. +30 28210 37663
Mob. +30
E-mail anastvergan@gmail.com
PDF CV

PhD Students

φωτογραφία

Maria Amenta, MSc. (Chemist)

Tel. +30 28210 37663
Mob. +30
E-mail amentam@ims.demokritos.gr
PDF CV

MSc Students

Kali Kapetanaki (Civil Engineer)

Tel. +30 28210 37663
Mob. +30
E-mail kelly_kapt@hotmail.com
PDF CV

Φωτογραφία

Sofia Tzanaki (Architectural Engineer)

Tel. +30 28210 37663
Mob. +30
E-mail sophie_tzan@hotmail.com
PDF CV

Students

φωτογραφία

Antonis Theologitis
Student of the School of Architectural Engineering
Tel. +30 28210 37663
Mob. +30
E-mail atheologitis@gmail.com
PDF CV

2. INFRASTRUCTURE

Infrastructure, Facilities

- Thermal Analysis (TG, DTA, DSC)
- UV-Vis with Diffuse and Specular Reflectance
- Colorimeter Portable spectrophotometer
- Infrared Spectrometry (IR, FTIR)
- Ultrasonic Homogenizer 1-50 mL (UP200S, Hielscher)
- Versatile Ultrasonic Bath
- TICO Ultrasonic Testing Instrument
- Schmidt Hammer (mortars)
- Mortar Testing Equipment (Sieves, Prismatic and Cubic Moulds, Flow Table, Vicat apparatus, Flow cone, Vibration Table)
- Computer Controlled Microwave Digestion
- High Temperature Furnaces
- Freeze Drying