

# Opening laser laboratories physically and digitally to the public; challenges and prospects

Paraskevi Pouli<sup>1</sup>, Demetrios Anglos<sup>1,2</sup>, Chrysoula Bekiari<sup>3</sup> and Costantinos Vasiliadis<sup>4</sup>

<sup>1</sup> Foundation for Research and Technology-Hellas, Institute of Electronic Structure and Laser, (FORTH-IESL), Photonics for Heritage Science, N. Plastira 100, 70013 Heraklion, Greece

<sup>2</sup> University of Crete, Department of Chemistry, Voutes University Campus, 70013 Heraklion, Greece

<sup>3</sup> Foundation for Research and Technology-Hellas, Institute of Computer Science (FORTH-ICS), Centre for Cultural Informatics, N. Plastira 100, 70013 Heraklion, Greece

<sup>4</sup> The Acropolis Museum, Dionysiou Areopagitou 15, 11742 Athens, Greece

ppouli@iesl.forth.gr

**Abstract.** Lasers have been shown as capable to illuminate complex diagnostic and cleaning problems and thus to contribute significantly to the study and restoration of Heritage objects and monuments. A number of laser material processing and spectroscopic methods has been specifically adapted with exceptional success to the requirements of a wide range of demanding conservation applications. Surface cleaning, based on laser ablation, has been particularly effective for removing selectively unwanted accumulations and altered over-layers in a variety of substrates while, spectroscopic techniques, such as Laser Induced Breakdown Spectroscopy (LIBS), micro-Raman and Laser Induced Fluorescence (LIF) spectroscopy, have been used to determine the chemical composition of materials in works of art and archaeological findings.

Restrictions associated with laboratory arrangements, health and safety issues and lack of knowledge delimit the presentation of the laser based diagnostic and conservation procedures to a broader public. In this respect, their employment in open laboratories has been targeted so to make their potential widely known. The realization of this aim was facilitated through the development of reliable (trans)portable analytical and cleaning laser systems, while tailor-made digital repositories and knowledge databases for the documentation of the CH objects and the dissemination the produced scientific data enhance this potential.

In this communication, experiences gained from the establishment of the first open laboratory in Greece at the Acropolis Museum will be presented. Technical issues related to health, safety and presentation challenges, as well as the social outcome of this initiative will be also discussed. Future prospects related to the development of two new advanced open laboratories in Athens (in collaboration with the National Gallery-Alexander Soutsos Museum (PROTEAS project) and the Ephorate of Antiquities of the city of Athens (CALLOS project)) will be also presented.

**Keywords:** laser analysis and conservation, open laboratories, Acropolis Museum, digital repositories, knowledge databases.

**Thematic:** Historical / Architectural Sites, Monuments and Complexes as Open Labs of Innovation and Sustainable Socioeconomic Development.