

## The main Polish conservation projects with the use of laser techniques

Roman Ostrowski<sup>1\*</sup>, Jan Marczak†, Andrzej Koss<sup>2</sup>, Halina Garbacz<sup>3</sup>, Karol Jach<sup>1</sup>, Wojciech Skrzeczanowski<sup>1</sup>, Antoni Rycyk<sup>1</sup>, Antoni Sarzyński<sup>1</sup>, Marek Strzelec<sup>1\*\*</sup>, Krzysztof Czyż<sup>1</sup>

<sup>1</sup>Military University of Technology, 2 Gen. S. Kaliskiego Str., 00-908 Warsaw, Poland

<sup>2</sup>The Interacademic Institute of Conservation and Restoration of Art, , Wybrzeże Kościuszkowskie 37, 00-379 Warszawa, Poland

<sup>3</sup>Warsaw University of Technology 141 Wołoska Str., 02-507 Warszawa, Poland

\*[Roman.Ostrowski@wat.edu.pl](mailto:Roman.Ostrowski@wat.edu.pl), \*\*[marek.strzelec@wat.edu.pl](mailto:marek.strzelec@wat.edu.pl)

The paper and presentation are dedicated to the memory of Professor Jan Marczak, originator of introduction of laser technique in to the conservation of art works in Poland, whose unexpected accident, fight for life in hospital and final death swamped in sadness all his friends and colleagues.



*Christ Pantocrator*, Tum, relief from 12th century during laser cleaning - (J. Marczak).

The beginnings of research on laser cleaning of monuments in Poland are dated in 1997 – first tests of method on elements of the Tomb of the Unknown Soldier in Warsaw. With the progress in technology of laser devices and increasing experience of team of co-workers, subsequent bigger and major conservation projects were realized. Among them, definitely the most important one in the past was project connected with conservation of Sigismund's Chapel of the Wawel Cathedral in Kraków. Later, lasers were widely used in restoration of architectural and sculptural decoration of the Collegiate Church of St. Mary and St. Alexius from 12th century in Tum and important Polish historical tombs and tombstones at Montmartre Cemetery in Paris. Complex diagnostics of laser cleaning process of metal artworks, funded in the frames of Norwegian/EEA Program was successfully realized in the years 2008-2011. In 2015, the team initiated the long-term project of evaluation and conservation of Wit Stwosz's Altarpiece, the largest Gothic altarpiece in the World and a national treasure of Poland, located behind the High Altar of St. Mary's Basilica, Kraków.

The paper summarizes the main research results, analysed by teams headed by Prof. Jan Marczak and Prof. Andrzej Koss, devoted to the different laser cleaning case studies, and evaluation of art works preservation state using different analytical methods from the area of materials engineering, optoelectronic, optics and lasers.