



Ca' Foscari
University
of Venice

PROJECT ACRONYM AND TITLE: RePAIR - Reconstructing the Past: Artificial Intelligence and Robotics Meet Cultural Heritage

FUNDING PROGRAMME: Horizon 2020 – Future and Emerging Technologies Open – Novel ideas for radically new technologies

CALL: H2020-FETOPEN-2018-2020

SCIENTIFIC FIELDS: Computer sciences, information science and bioinformatics; Electrical and electronic engineering; Humanities

HOST DEPARTMENT: DAIS - Department of Environmental Sciences, Informatics and Statistics

SCIENTIFIC RESPONSIBLE: Prof. Marcello PELILLO

FINANCIAL DATA:

Project total costs	Overall funding assigned to UNIVE
€ 3.522.010	€ 586.066

ABSTRACT:

Our goal with this project is to develop a ground-breaking technology to virtually eliminate one of the most labour-intensive and frustrating steps in archaeological research, namely the physical reconstruction of shattered artworks. Indeed, countless vases, amphoras, frescos and other ancient artefacts, all over the world, have not survived intact and were dug out from excavation sites as large collections of fragments, many of which are damaged, worn out or missing altogether. Reconstruction of small artefacts is typically done by experienced operators, possibly with the assistance of dedicated software, but when the number of fragments is large (say, of the order of thousands) manual or computer-assisted restoration is simply hopeless. This prevents a large fraction of the world's cultural heritage from being openly accessible to scholars as well as the general public. By developing and integrating novel technologies in the fields of robotics, computer vision and artificial intelligence, we envisage a future where archaeology can deal effectively with reconstruction problems at an unprecedented scale and be able to bring back to life ancient artworks and masterpieces which would otherwise remain broken into pieces forever. Specifically, we aim to develop an intelligent robotic system which will autonomously process, match and physically assemble large fractured artefacts at a fraction of the time it takes humans to do. The level of ambition of our proposal poses several challenges that cannot be satisfactorily addressed with off-the-shelf technologies, and hence we shall develop brand-new solutions that will push the boundaries of research in the fields of robotics and computer vision. Our system will be tested over iconic case studies from the UNESCO World Heritage site of Pompeii, and one tangible outcome of the project will be to restore two world-renowned frescos which are now shattered into thousands of fragments and forgotten in storerooms.

Planned Start date	Planned End date
1 st June 2021	31 st December 2024

PARTNERSHIP:

1.	UNIVERSITA' CA' FOSCARI	Italy	Lead partner/coordinator
2.	BEN-GURION UNIVERSITY OF THE NEGEV	Israel	Partner
3.	FONDAZIONE ISTITUTO ITALIANO DI TECNOLOGIA	Italy	Partner
4.	ASSOCIACAO DO INSTITUTO SUPERIOR TECNICO PARA A INVESTIGACAO E DESENVOLVIMENTO	Portugal	Partner
5.	RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAT BONN	Germany	Partner
6.	MINISTERO PER I BENI E LE ATTIVITA' CULTURALI E PER IL TURISMO	Italy	Partner