Roma Tre

Geosciences Colloquium

Roma Tre - Sapienza 2025

SAPIENZA UNIVERSITÀ DI ROMA

Jessica Clementi

Department of Earth Science, Sapienza University of Rome

Heritage in Focus: Sustainable Technologies for Cultural Heritage Buildings Monitoring

20.05.2025, Aula Lucchesi, h:16:30 and on Meet

SCIENZE
Dipartimento di Eccellenza

For information: paolo.ballato@uniroma3.it or marco.romano@uniroma1.it

DOTTORATO DI RICERCA IN SCIENZE DELLA TERRA

ABSTRACT

Cultural heritage is increasingly at risk due to a combination of environmental, climatic, and anthropogenic pressures. These include natural weathering, pollution, structural instability, and the growing impacts of climate change. Monitoring plays a crucial role in preserving these valuable assets, yet traditional methods—such as visual inspections and manual instrumentation—can be invasive, time-consuming, and often limited in scope. To address these challenges, sustainable and technologically advanced solutions are essential.

This presentation highlights two key non-invasive monitoring techniques that are transforming heritage conservation practices: Interferometric Synthetic Aperture Radar (InSAR) and Photomonitoring. InSAR is a remote sensing method that utilizes satellite radar data to detect even minute ground or structural displacements with high precision. Its ability to cover large areas regularly and cost-effectively makes it especially suited for monitoring heritage sites exposed to slow-moving but potentially hazardous deformations.

Photomonitoring, based on time-lapse digital image analysis, complements InSAR by documenting surface-level changes. Through repeated image acquisition and automated comparison algorithms, this method can detect subtle deterioration indicators such as crack formation, material loss, or biological growth. It is highly flexible, scalable, and adaptable to different environments and resource levels.

Both these technologies offer a sustainable, efficient, and scalable approach to cultural heritage monitoring. Their combined use allows for earlier detection of risks, more accurate assessments of structural health, and optimized allocation of conservation resources.