



# SMART & SUSTAINABLE MATERIALS FOR ENERGY-EFFICIENT BUILDINGS

Thermal Energy Storage • Phase Change Materials • Bio-Based Materials • Low-Carbon Concrete • Machine Learning

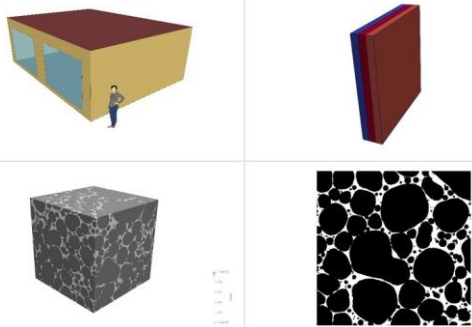
DICCA – University of Genoa | Research Group Coordinator: Prof. Antonio Caggiano

Senior Researchers: Dr.-Ing. Ignacio Peralta – Prof. Saulo Rocha Ferreira



01

## THERMAL ENERGY STORAGE & BUILDINGS



PhD researchers

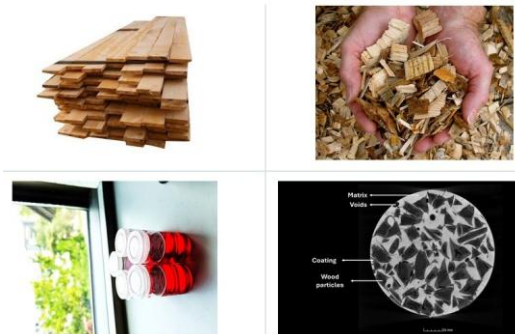
Mahdi Zanjani  
Thaynà Moreira Silva  
Hala Salhab

PCM integration, thermal storage and  
material-to-building optimization.

PCM | TES | Building energy |  
Optimisation

02

## PCM ENCAPSULATION & BIO-BASED TES



PhD researchers

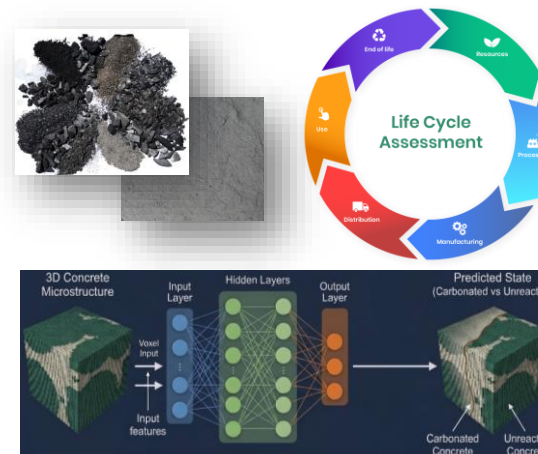
Chiara Pezzoli  
Hala Salhab  
Mahdi Zanjani

Bio-based shells, micro/nano-  
encapsulation PCM systems.

MPCM | Bio-based shells | Wood + PCM |  
Characterization

03

## AI, MODELLING & OPTIMISATION & LCA



PhD researchers

Reza Sadeghi  
Mauricio Mascotto  
Marga Coronel

Data-driven and multi-scale modelling  
of thermo-mechanics.

Machine Learning | Numerical modelling |  
Multi-scale | Design

04

## LOW-CARBON & BIO-BASED MATERIALS



PhD researchers

Marga Coronel  
Reza Sadeghi  
Mahdi Zanjani

CO<sub>2</sub> uptake, eco-designed concrete  
and circular bio-based materials.

CO<sub>2</sub> uptake | Bio-concrete | Algae |  
Circular materials

## FROM MATERIALS TO BUILDINGS

MATERIALS



COMPONENTS



BUILDINGS

PCM/TES • Encapsulation • Experimental characterization • Numerical modelling • Machine Learning • CO<sub>2</sub> uptake



## LOOKING FOR COLLABORATIONS

Joint EU projects • Research mobility  
Experimental validation • Data / modelling  
PCM & TES • Low-carbon materials

