

**PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 1 EARLY STAGE GRANT LASTING 12 MONTHS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENT OF ENGINEERING AND APPLIED SCIENCES (A.R.F. 08/C1 – DESIGN AND TECHNOLOGICAL PLANNING OF ARCHITECTURE - A.D. ICAR/11 – BUILDING PRODUCTION) - TYPE B**

*announced with decree of the Rector Rep. no. 681/2018 of 22.10.2018 and posted on the official registry of the University on 24.10.2018*

**RESEARCH PROJECT**

**“Study on electromagnetic radiation shielding materials for construction industry”**

**Research structure:** Department of Engineering and applied sciences

**Duration of the grant:** 12 months

**Scientific Area:** 09 - Industrial and information engineering

**Academic recruitment field:** 08/C1 – Design and technological planning of architecture

**Academic discipline:** ICAR/11 – Building production

**Scientific Director:** Prof. Giuseppe Ruscica

The use of electromagnetic radiation (GHz) shielding materials in buildings is currently limited to a niche such as electronic devices' protection from external interference or building walls' shielding from excessive radiation. Moreover, some persons are sensitive to electromagnetic radiation and a shielding from cell phone towers erected upon buildings is necessary with solutions different from “metal cages”. Currently, the protection of sensitive locations from electromagnetic pollution is obtained through metal walls' shielding. However, metal walls are heavy elements and they can make living spaces really uncomfortable. This project aims to develop high performance shielding materials using a different strategy: 1) mixing mortar or concrete with a secondary conductive phase deriving from biomasses, 2) realizing ceramic foams modified at low density. The shielding effectiveness will be measured within a collaboration with Politecnico di Torino.

a) In a preliminary phase a series of measures of electric permittivity will be carried out in the range of cell phone wavelength (frequencies of 700/2000 MHz). In a following phase it is planned to measure the shielding effectiveness only on some samples among the ones described in the next section.

b) Several planar mortar samples with addition of a conductive phase will be prepared, such as: mortar with addition of commercial biochar, mortar with addition of pyrolyzed sucrose, mortar with addition of graphene and a reference mortar.

The project will be carried out through a collaboration with prof. Isabella Natali Sora (Università degli Studi di Bergamo), prof. Jean-Marc Christian Tulliani (Department of Applied Science and Technology, Politecnico di Torino) and prof. Patrizia Savi (Department of Electronic and Telecommunication, Politecnico di Torino).

The results of this research will most likely be published on:

1) Construction and Building Materials

2) Composites Part B: Engineering

and will be presented at the conferences:

1) ISTeA (Italian Society of Science, Technology Engineering of Architecture)

2) XVI ECerS Conference 2019