



# Ricerca, Trasferimento Tecnologico e Recruiting al distretto Navile:

Dipartimenti di Chimica, Chimica Industriale, Farmacia e Biotecnologie



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

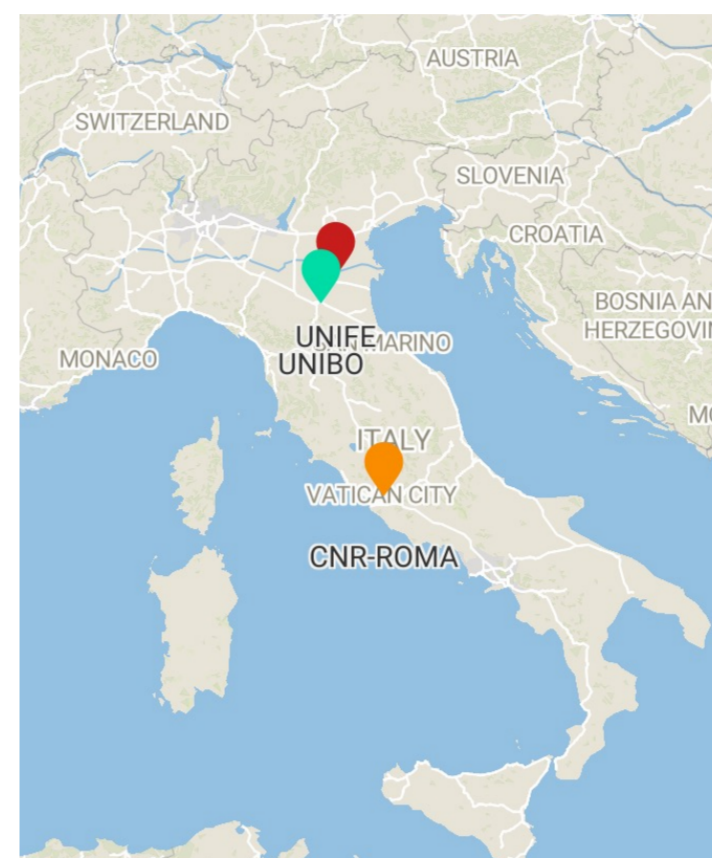
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BIOACTIVE COATINGS TO PRESERVE  
METAL SURFACES  
IN CULTURAL HERITAGE AND  
HEALTHCARE

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## CRITICAL ISSUES

**Bacterial contamination/colonization of metal surfaces** is a challenging issue affecting many aspects of modern society

### Healthcare safety



Bacterial  
colonization

Healthcare-  
associated infections

### Cultural heritage materials conservation



Biodeterioration

## PROJECT AIM

Development and study of new generation safe bioactive coatings to be applied on metal substrates to provide:

- anticorrosion protection
- antibacterial and antibiofilm activity
- biocompatibility
- environmental sustainability

## SUBSTRATES TO BE PROTECTED BY COATINGS

### Healthcare safety

COPPER

### CH materials conservation

BRONZE

## EXPERIMENTAL APPROACHES

### COATINGS PRODUCTION

#### a) Toxic-solvent-free coatings



#### b) Biobased coatings derived from food waste



### FUNCTIONALISATION

Ag & Zn  
nanoparticles



Copper

(Healthcare application)

Bronze

(Cultural Heritage application)

### ANALYSES AND TECHNIQUES

1. Optimisation of the coatings formulation via Design of Experiment (DoE)
2. Antibacterial and antibiofilm activity + microbial response to the new generation coatings and metal nanoparticles
3. Biocompatibility assays using human cell lines to test the cytotoxicity of the coatings
4. Durability of the coatings assessed by natural and artificial ageing conditions
5. Sustainability of the best formulations production compared to the commercial alternative products via LCA