

The Convergence of Living Essence
and Engineered Innovation

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M a t e r i a l s

Book of Abstracts

Archibiome tattoos: biofabricated microbial inks for resilient and sustainable architecture

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The REMEDY project develops a new technology - archibiome tattoo for decoration and functionalization of building surfaces. This approach uses biofabrication with living, metabolically active microorganisms to provide high-resolution decorative patterns combined with functional properties for both new and existing structures. Living inks act like probiotic skincare for architecture: enhancing resilience against pathogenic microorganisms, enabling carbon sequestration, oxygen production, pollutant capture, and self-healing, while offering aesthetic customisation. Designed for compatibility with porous and non-porous substrates, the coatings integrate tailored microbial inks - interkingdom consortia engineered for environmental responsiveness and functional performance (Fig. 1).

Advanced computational tools, including genome-scale metabolic modelling, metagenomic analysis, and machine learning, guide the formulation of stable, nutrient-efficient, and responsive microbial assemblies. This predictive design framework enables the customisation of both form and function, from growth patterns to surface properties, aligning with Safe and Sustainable by Design (SSbD) principles.

By transferring breakthroughs from microbiology into materials science, REMEDY pioneers a new class of engineered living materials (ELMs) that blend sustainability, adaptability, and artistic expression. The approach supports circular use cycles in construction and seeks to transform the perception of microorganisms in architecture - from invisible threats to visible, beneficial partners. This “high-risk, high-gain” concept aims to initiate a microbial revolution in the building industry, redefining how we perceive, design, and interact with materials.

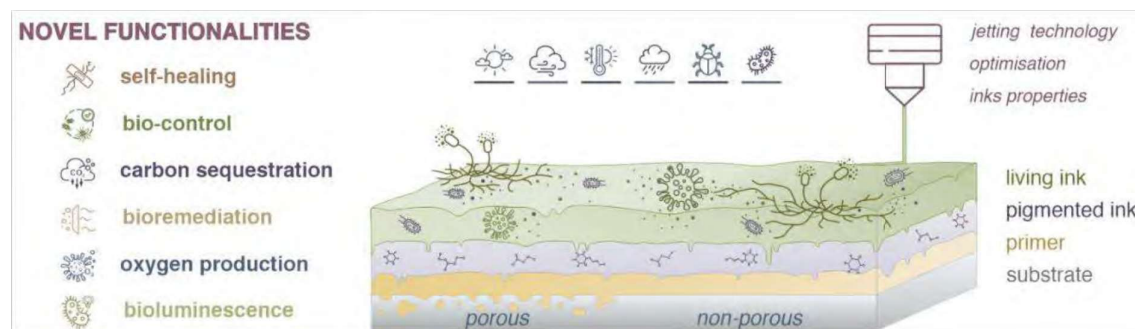


Figure 1. Concept of probiotic living inks for architecture. Engineered interkingdom microbial consortia form functional, decorative inks compatible with diverse substrates, providing resilience against pathogens, environmental responsiveness, carbon sequestration, oxygen production, pollutant capture, and self-healing capabilities.

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