**Symbiotic living materials**

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The aim of the project is to establish the scientific principles of living material ecosystems, in which living microorganisms adapt to human made environments and contribute to the production and functionalization of the synthetic material scaffold. This will open a radically different approach to material innovation, based on symbiosis, mutualism and ecology. To do that we want to encapsulate living bacteria in synthetic lipid vesicles, i.e. bactosomes, and study how microbes and vesicles adapt and modify each other, and whether their coevolution can be directed. The choice of the system is inspired by the observation of bactosomes in almost all higher organisms forming symbiotic or parasitic relationships with microbial cells.

The multidisciplinary nature of the project, combining microbiology, soft matter, evolution and material design offers training in various biological and physical concepts and opportunities to collaborate with social scientists, designers as well as industrial partners for the formulation of probiotic foods, cosmetic and medical products.

Our minimal and well controlled experimental system will provide unique insights on how bactosomes are formed and how they facilitate the mutualistic relationships between microbes and hosts. In addition, together with our industrial partners, we will explore the possibility of using bactosomes in the formulations of probiotic foods, cosmetic and medical products, to achieve protection, confinement and release of probiotic bacteria and their products to target destinations.