# PhotoSwim

## Engineering of Photo-rechargeable Nanoswimmers using Multicomponent Heterojunctions

*Timeline* | 05/2023 to 04/2028

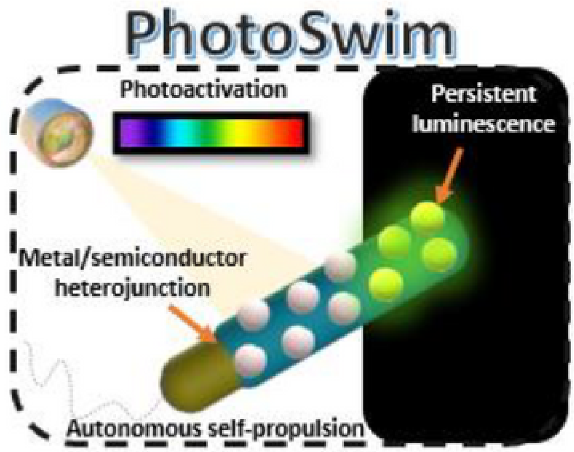
*Budget* | 1.500.000 €

*ICIQ People* | Katherine Villa Research Group

https://cordis.europa.eu/project/id/101076680

*Call* | ERC-2022-STG

## SUMMARY


The realization of smart nanoswimmers capable of moving and performing desired tasks in an aqueous environment is a technological challenge due to the viscous and thermal forces exerted upon them. While various types of external stimulus can be used to activate their autonomous motion, light is the easiest to operate and most flexible, due to the opportunities that it offers for motion modulation through intensity, wavelength, and direction. However, such optical control is affected by the properties of the aqueous media, limiting the applicability of light-driven nanoswimmers to non-scattering environments. The novel approach of this project (**PhotoSwim**) is the design of hybrid nanoswimmers that consist not only of photocatalytic but also persistent luminescent materials in order to provide triple light-responsive, light-storage, and light-emissive properties at the material level. This project will explore the potential of these innovative photoactivated swimmers to: (1) store and emit sufficient light energy to maintain motion in the absence of external irradiation, (2) exhibit long-term luminescence for tracking purposes, (3) move and interact with their surroundings at high speeds due to efficient charge pair separation and (4) achieve a major control over their motion by wavelength tunability. The knowledge obtained will then be used to expand the applicability of these hybrid nanoswimmers in scenarios of limited light penetrability. Specifically, their capabilities to maintain their photoactivity in the presence of chemical and biological interferences, along with real-time monitoring of their location by the emitted luminescence, will be tested. In this way, the potential of advanced multi-functioning nanoswimmers to keep moving and interacting with the surroundings in scenarios where the light supply is not fully available will be demonstrated.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