

Title: Efficient light conversion base on engineered bio-hybrid photosystems

Here we propose an experimental work that will apply combined techniques of molecular biology and spectroscopy for the generation and characterization of photosystems based on photoactive proteins.

The objective of our research group is to design artificial photosystems that can efficiently utilize light as an energy source. To achieve this, we draw inspiration from nature, which utilizes protein matrices to enhance the light-capturing efficiency of photoactive molecules. Similarly, we generate synthetic proteins in the laboratory that are capable of light capture, and we study how altering the protein sequence can optimize light-capturing properties. **The general goal of this project is to generate different variants of photoactive proteins and characterize their stability.** For the generation of these systems, we employ molecular biology methodologies, and for their characterization, techniques such as liquid chromatography and circular dichroism.

In this master thesis, you will be integrated into an interdisciplinary environment where chemists, physicists and biologists work together. This project combines are of knowledge that involve both physical chemistry and biochemistry.

The objectives of this thesis project are:

1. To learn about protein synthesis methodology and functionalization.
2. To design and implement strategies for optimizing the stability of bio-hybrids.
3. To become familiar with experimental concepts of spectroscopy and its use in characterizing photosystems.

For more information visit our group webpage sarahmejias.com

Sara H Mejias, PhD sara.hernandez@imdea.org

IMDEA Nanociencia

C/Faraday, 9

Madrid (Spain)

Bioengineered nanophotonics group