

Background:

DNA is a remarkable material for nanoscale fabrication. Short strands of DNA can be programmed such that Watson-Crick pairing between complementary strands leads to the self-assembly of complex nanostructures, such as DNA origami.

Molecular Robotics builds on the recent technological developments that allow us to read, edit, and write DNA to create highly elaborate molecular nanostructures and devices from the bottom up. DNA origami is an exceptionally robust method that has found applications as biosensors, drug delivery systems, and tools for single-molecule nanotechnology.

DNA nanostructures are highly biocompatible and have the correct scale to interact with other molecular and nanoscale systems, making them suitable for molecular robotics. DNA self-assembly allows us to tailor the properties of nanomaterials, obtaining ordered structures with distinct physical, chemical, and optical properties. Understanding and controlling these properties will enable us to create molecular versions of biologically inspired robotic nanodevices.

Project description:

The master project will involve the design, fabrication and characterization of DNA nanostructures interfacing with other nanomaterials, such as proteins, lipids and nanoparticles. The student will design and construct DNA self-assembled Origami structures with different shapes and sizes, characterize them using AFM and TEM. On the one hand, these DNA nanostructures will interact with colloidal nanoparticles such as Au NPs to control their assembly at the molecular level. Another goal is to study the interaction of DNA nanostructures with lipids, as models to mimic synthetic cells.

Research methods:

- DNA nanotechnology methods (gel electrophoresis, PCR)
- Wet lab experiments
- UV-Vis spectroscopy
- Microscopy characterisation tools (AFM, fluorescence optical microscopy, SEM)

Application:

Interested students (with a physics, chemistry or bioengineering background) can contact **Ibon Santiago** for more information, i.santiago@nanogune.eu

To apply for a master scholarship fill in the form below and follow the instructions and recommendations of the general call (**open until 30 June 2022**).

NOTES:

(i) All applicants will receive an answer after the end of the selection process; but please note that due to the large number of submissions that are expected, we cannot provide individual feedback.

(ii) Additional information about nanoGUNE's commitment towards HR excellence in Research and Gender Equality are available on our website.

(iii) We encourage you to subscribe to our HR mailing list to receive information related to nanoGUNE's open positions and open calls for different training and talent attraction programs.