Background:

DNA is a remarkable material for bottom-up nanofabrication. Short DNA strands are 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 sequence, 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 in nanomedicine 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 nanorobotic systems that resemble biological machinery.

Shape folding using DNA Origami strategy starting from viral circular single-stranded DNA. Short staple strands anneal to the scaffold during a cooling process to afford different 2D and 3D shapes.

Project description:

The master project will involve designing, fabricating, and characterising DNA nanostructures interfacing with other nanomaterials, such as proteins, lipids, and nanoparticles cross-linked to nucleic acids. The student will develop and construct functional DNA nanodevices and characterize them using scanning probe methods (Atomic Force Microscopy) and fluorescence microscopy.

Research methods:

DNA nanotechnology methods (gel electrophoresis, size-exclusion chromatography); Wet-lab nanotechnology experimental methods; Spectroscopy tools (UV-Vis, fluorometric analysis); Scanning probe techniques (Atomic Force Microscopy); Optical microscopy.

Application:

If you are a master student (with a physics, chemistry, materials science, biomedical or bioengineering background) and you are interested in this project, please get in touch with the Self-Assembly Group Research Fellow, **Ibon Santiago** for more information, (i.santiago@nanogune.eu).

To apply for a **master position** fill in the form below and follow the instructions and recomendations of the general call (**open until 30 June 2023**).

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.