The Nanoscience Cooperative Research Center nanoGUNE, located at the Ibaeta Campus of the UPV/EHU in Donostia – San Sebastián, offers a

MASTER PROJECT

position on

Robust coding strategy to store digital information in DNA libraries

Master degree: UPV/EHU - Master's Degree in Computational Engineering and Intelligent Systems.

Research group: Self-assembly

- Our group studies the self-assembly of biological (peptides, proteins, and viruses), organic (polyelectrolytes), and inorganic (nanoparticles) building blocks. The assembly systems are applied to the development of novel nanoscale and microscale devices.

Master project:

Incorporating biomolecules as integral parts of computational systems represents a frontier challenge in bio and nanotechnology. Using DNA to store digital data is an attractive alternative to conventional information technologies (IT) due to its high information density and long lifetime.

However, how to encode information efficiently remains a challenge. As shown in the figure below, available methods range from direct mapping from bases to bits to more sophisticated techniques, including redundancy and error correction.

This project will consist of three parts: 1) One is to survey different state-of-art encoding methods, including Goldman and DNA Fountain schemes, and compare their efficiency and suitability to various synthesis and sequencing methods. 2) Second, the candidate will work with our experimental team members to identify the coding requirements for a pilot DNA storage system under development. 3) The last part of the project will be to optimize and develop the coding/decoding strategy into a complete software package (using R, Python, or MATLAB). The encoding schemes will then be tested in silico with oligonucleotide libraries.

The student should be familiar with data storage concepts (e.g., random access, error correction coding) and information compression methods. The student will have good programming skills, be versed in GitHub and python libraries, and should be willing to learn about bioinformatics and the biochemical and physical properties of nucleic acids.

We **promote** teamwork in a diverse and inclusive environment and welcome all kinds of applicants regardless of age, disability, gender, nationality, race, religion, or sexual orientation.

The starting date is flexible.

Interested **candidates** are welcome to contact **Dr Ibon Santiago** (i.santiago@nanogune.eu)

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.