

The Nanoscience Cooperative Research Center, CIC nanoGUNE, located in Donostia / San Sebastian, Basque Country (Spain), is currently looking for a

## MASTER STUDENT

to work on

### **CIC05: Master project on EXPLORING DEVICES WITH VAN DER WAALS HETEROSTRUCTURES**

NanoGUNE is a research center devoted to conducting world-class nanoscience research for a competitive growth of the Basque Country. NanoGUNE is a member of the Basque Research and Technology Alliance ([BRTA](#)) and is recognized by the Spanish Research Agency as a *María de Maeztu* Unit of Excellence.

The **position** is offered in the Nanodevices Group, led by Casanova Fernández, Felix / Hueso Arroyo, Luis ([l.hueso@nanogune.eu](mailto:l.hueso@nanogune.eu) / [f.casanova@nanogune.eu](mailto:f.casanova@nanogune.eu)). The group counts with extensive research facilities for fabrication and characterization of devices and several active research lines spanning from nanofabrication to 2D electronics and spin transport.

The candidate will join a **research line** focusing on different research themes: Spintronics, Multifunctional devices and Advanced nanofabrication. We are mostly interested in the electronic properties of systems in reduced dimensions. More information can be found at <https://www.nanogune.eu/nanodevices>.

The aim of the **project** is to Conventional monolithic materials have dominated electronic and optical devices for decades, mostly thanks to our ever-increasing ability to control the properties of bulk materials. However, as we approach the range of the single nanometre scale in our fabrication capabilities, it is necessary for the industry to be able to create, control and profit from novel materials and architectures.

In this context, the rich library of 2D layered materials present multiple opportunities to design novel spintronics and valleytronics devices.

Making use of the possibility to create 2D artificial van der Waals heterostructures, in this project we will overcome single materials by focusing on the interface as an active playground.

For instance, we will perform interface engineering by combining different magnetic and non-magnetic 2D layers in an unprecedented fashion, exploring new magnetic ground states which are not accessible neither in single materials nor in conventional multilayers.

We will also explore spin and valley physics in van der Waals heterostructures by combining 2D layered materials with complementary properties.

More information about our research in this topic can be found in this selection of our recent articles: Nano Letters 19, 1074 (2019), Nano Letters 19, 8758 (2019), APL Materials 8, 071103 (2020) and Phys. Rev. Lett. 127, 047202 (2021).

In this project, the Master student will be responsible for the design and preparation of structures by exfoliation and stamping of 2D materials in controlled atmosphere and device fabrication by standard electron-beam lithography. (S)he will be also involved in the magneto-transport measurements (high magnetic fields and low temperatures), data analysis, and drafting of results.

We offer an international and competitive environment, state-of-the-art equipment (including a class 100 cleanroom for nanofabrication capabilities), and the possibility of performing research at the highest level.

#### Description of the research group

The Nanodevices Group in CIC nanoGUNE is mostly interested in the electronic properties of systems in reduced dimensions. Our research program is currently articulated around different themes of research

related to spintronics, multifunctional devices and advanced nanofabrication. For more information, see our website at <https://www.nanogune.eu/nanodevices>.

The successful **candidate** will have a .

Additionally, the candidate should demonstrate experience in the following skills:

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Although not compulsory, the following points will be considered:

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**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 position is expected to start in 01/09/2023 and for a total length of up to 10 months (01/09/2023 - 30/06/2024) in the Nanodevices Group. The contract will be funded by the .

Candidates should **apply** by completing the form below and attaching the following documents:

- a. A complete CV
- b. A cover letter and at least two reference letters grouped in a single PDF file

The **deadline** for applications is **30/06/2023**.

**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.*