

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

### Exploiting the spin-orbit coupling in spintronic nanodevices

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**, co-led by Luis E. Hueso and Fèlix Casanova. More information can be found at: <https://www.nanogune.eu/en/research/groups/nanodevices>

#### Project Description

Orbitronics is an emerging research field spanning condensed matter physics and materials science to electrical engineering that focuses on the study and manipulation of the electron's orbital angular momentum (OAM). The key idea is to use the OAM of electrons as a means to store, transfer, and process information, similar to how spintronics leverages the electron's spin. Importantly, OAM can be generated by a wider range of material systems and with theoretically much higher efficiency than its spin counterpart, using cheap, environmentally friendly and abundant light-weight elements.

In this project, we aim to explore the orbital Hall effect and its inverse in 3d transition metals (TMs) as a mechanism to generate and detect OAM currents. The interaction of these OAM currents with external magnetic fields or with ferromagnetic metals (FM) in TM/FM bilayers gives us information about the mechanisms behind this OAM generation and transport.

An example can be seen in our recent paper on the topic: *Newton* 1, 100290 (2025). Further information can be found in this review paper: *Nature Phys* (2025) <https://doi.org/10.1038/s41567-025-03143-w>

In this **project**, the master student will be responsible for the design and the fabrication of nanodevices (thin film deposition, electron beam lithography, etching). The student will be also involved in the magneto-transport measurements (high magnetic fields and low temperatures) at both DC and RF frequencies, data analysis, and drafting of results.

Project Director: **Fèlix Casanova** ([f.casanova@nanogune.eu](mailto:f.casanova@nanogune.eu))

Note: This is an experimental project. The master student will carry out all experiments at CIC nanoGUNE in Donostia/San Sebastián.

Candidates should **apply** by following the instructions and recommendations of the general call and by completing the form below and attaching the following documents:

- a. A complete CV
- b. Academic record and cover letter in a single PDF file

The **deadline** for applications is **06/04/2026**.

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.*