

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

Nanoengineering

The Nanoengineering Group

Group Leader: Andreas Seifert

Strategy

Our vision...

Generating a positive social impact by giving solutions to real-life problems and needs

Our mission...

Developing new disruptive technologies that combine photonics, nanotechnology and artificial intelligence

- ✓ Continuous
- ✓ Real-time
- ✓ Reusable
- ✓ Portable
- ✓ Non-invasive
- ✓ In vivo & in vitro
- ✓ Reliable & accurate

HIGH PERFORMANCE

Application Fields

Health

- **Medical care:** clinical diagnostics & monitoring
- **Sports industry:** performance and health

Agri-food industry

- **Elaboration process:** safety & quality
- **Protected designation of origin**

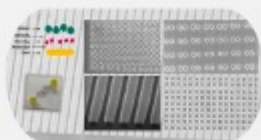
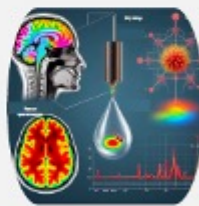
Other sectors

- **Consumer materials:** safety & quality
- **Environmental monitoring**

Research Lines

Early Detection of Alzheimer's

- Holistic, non-invasive early detection of Alzheimer's disease
- Microscopy imaging, Raman spectroscopy, surface-enhanced Raman spectroscopy, Fourier-transform infrared spectroscopy in combination with artificial intelligence
- Advancing early detection through the analysis of human body fluids

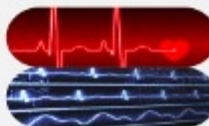


Plasmonic Detection of Biomarkers

- Investigation of highly sensitive plasmonic devices with diverse nanostructures
- In-silico modeling employed to identify optimized designs
- Utilization of optimized designs in: Liquid biopsy, Food control and Measurement of environmental conditions

Photonic Monitoring of Physiology and Vital Signs

- Development of methods and devices for continuous, non-invasive monitoring of physiological parameters
- Vital Signs monitoring



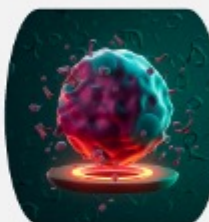
Lung Cancer Detection Through AI-Driven Spectroscopy

- Ground-breaking combination of vibrational spectroscopy, machine learning, and state-of-the-art statistics
- Redefining lung cancer detection with astonishing accuracy
- Setting new standards in life-saving healthcare innovation



Vibrational Spectroscopy in Cell Therapy

- CART cell therapy for liquid tumors (chimeric antigen receptor T-cell therapy) applied to live cells
- Quality control, manufacturing, and safety
- Potential immune responses in recipients
- Investigation using Raman and Fourier-transform infrared spectroscopy throughout therapy
- Integration of artificial intelligence for understanding cell characteristics and improving treatments



Environmental Engineering

- Water remediation by biocompatible materials
- Monitoring of air pollution
- Trace gases in the atmosphere
- Artificial intelligence for design of experiment and data



Experimental Work



Experimental Design

Sample Preparation of Biofluids

- Blood, urine, saliva, cerebrospinal fluid, cells samples
- Collected as per hospital's regulations
- Centrifugation
- Sample storage at -80°C
- Only fully thawed samples chosen for experiments

Modeling

Measurements, Data curing and Modeling

- Vibrational spectroscopy measurements, Raman, FTIR, Fluorescence
- Spectra contain many unwanted signals and features \rightarrow Preprocessing
- Removal of disturbing parts for best classification performance
- Always as much as necessary and as little as possible



Model Evaluation



| Confusion matrix | |
|------------------|----------------|
| True positive | False positive |
| False negative | True negative |

Research Team



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

- a. A complete CV and academic record
- b. A motivation letter is also recommended

The **deadline** for applications is **29/02/2024**.

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.