

Scholarship Application Template

**PhD SCHOLARSHIP APPLICATION DATA**

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Business Division	DEMA
Business Area	URBAN
Scholarship location	ED 700
Province/Building	BIZKAIA

**SCHOLARSHIP DESCRIPTION**

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**Title: Nature-Based Solutions (NBS) for adaptation to climate change and increased urban and land resilience**

**Brief description of scholarship:**

The purpose of this research is to improve knowledge related to the cost-benefit analysis and effectiveness of nature-based solutions (NBS) as a Climate Change (CC) adaptation measure, creating tools contributing to their integration into urban, land and infrastructure design and development.

**Scholarship description:**

The chief aim of this doctoral thesis is to **assess NBSs efficiency as climate change adaptation measures to optimise their design, development and implementation.**

This assessment will be based on different economic, social and environmental criteria. The line of research, although it will focus mainly on the environmental evaluation of the effectiveness of the adaptation measures, first of all quantifying the reduction of the potential impact of CC, will also contemplate the economic and social analysis of these measures, so that a global evaluation of the sustainability of these solutions can be obtained. An effectiveness assessment **is carried out through modelling where the baseline scenario without adaptation is compared to one or several scenarios** in which alternative adaptation measures are implemented. The models used are, on the one hand, **urban climate (micro or meso scale) to study heat stress and heat island effect**, and on the other, dynamic simulation models **of rain-run-off for the study of rain flooding**. Based on these models, the effectiveness of adaptation actions to reduce temperature and storm water run-off retention is assessed. Modelling may also be compared with **on-site sensor measurements** and/or stations which facilitate models calibration and validation.

There is a current trend whereby green infrastructures are being deployed or urban and infrastructure greening, which is proposed as a driving force for change in cities and land, to turn waterproofed inert soil into green and blue areas. In the scope of CC adaptation, NBSs seem to be an opportunity to enable resource optimisation as well as addressing CC adaptation in a more economic, flexible, resilient and innovative way. For this purpose, it is important to know and quantify the effectiveness of NBSs with greater precision and to **develop mechanisms and tools which facilitate their integration in urban and land initiatives** from climate proofing and flexible adaptation planning perspectives and approaches.

Within this context, this scholarship intends to achieve the following **specific outcomes**:

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- analysing the **actual effectiveness of Nature-Based Solutions** by comparing the results obtained from thermal or water model simulations in relation to real-life data measured by sensors (this will be selected according to the successful candidate);
- **Cost-benefit** analysis of the solutions, including economic and social evaluation criteria of these measures. To do so, different scenarios and complementary aspects will be considered, such as the evaluation of the natural capital and the consideration of the environmental externalities in the analysis to be carried out.
- study of the possibility of **jointly assessing multi-benefit effectiveness** of the solution in relation to heat stress and heavy rain threats, as well as other environmental, economic and social joint benefits;
- identification of **design criteria of the solutions** (materials, location, etc.) for companies involved in the design and marketing of products which improve the effectiveness of CC adaptation measures;
- exploring **ways of introducing NBS in urban, land and infrastructure design and development** (transport, energy, etc.), within the planning instrument framework (PGOU, PTP, PTS, etc.) through mechanisms such as EIA, ECIA, standards and regulations, etc., based on approaches such as climate proofing and flexible adaptation planning; and
- definition of **functionalities and specifications for the development of own tools, systems or applications** to address the foregoing challenges and facilitate the generation of technological assets for further exploitation by Tecnalia, such as the adaptation pathway design tool.

For this reason, the successful candidate will be incorporated into the Climate Change research group of the Energy and Environment Division, and will participate in international projects in the field of the doctoral thesis and will spend between 3 and 6 months at one of the leading centres in this field.

#### Candidate requirements:

- Degree and specialisation: Physics, Engineering, Mathematics, Architecture, Environmental Science or Biology. Hold a university Master's degree that allows access to the PhD scholarship programme prior to incorporation in the scholarship.
- Languages: English is essential (advanced spoken and written skills).
- IT skills: (specify programmes and command of them): knowledge of programming preferably Python; "R" or other languages.

The following will be a plus:

- Good academic record.

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- Knowledge of urban climate or rainfall run-off modelling; and/or knowledge of statistics (multivariate analysis, categorical linear regression, cluster analysis or MCA, among others).
- Passion for research
- Teamworking skills
- Initiative to put forward new ideas and implement them.

**Further information and applications:** <http://bit.ly/2IXGPII>