UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

RESEARCH CERTIFICATE

This is to certify that Rafael Camilo Gutiérrez Melgarejo, holder of Colombian passport number is conducting research at the Polytechnic University of Catalonia in Barcelona, Spain, from October 22, 2022, to the present. Currently, Mr. Gutiérrez is developing the project titled **Neuromorphic Cementitious Materials for Civil Engineering Applications (NEUROCRETE)**

The NEUROCRETE project aims to develop intelligent cementitious materials capable of detecting and mitigating internal damage in concrete structures, thereby enhancing their durability and resistance. This innovative approach is grounded in neuromorphic principles inspired by the functioning of the human brain, with the goal of designing materials that can identify and respond to structural failures at an early stage.

The project focuses on critical infrastructures, such as bridges, rigid pavements, and buildings, where early fault detection is essential for ensuring structural safety and stability. Advances made in NEUROCRETE could lead to more effective maintenance management and the optimization of new construction designs. The implementation of intelligent materials is expected to yield safer, more durable structures with self-diagnostic capabilities and early damage response.

Mr. Gutiérrez's involvement in this project is vital for developing solutions that enhance structural stability in bridges and buildings, contributing to the overall safety of infrastructures and potentially reducing costly interventions. Additionally, his work may facilitate the creation of materials that help achieve savings in maintenance costs, extending the lifespan of infrastructures while minimizing the risks of unexpected failures.

This certificate is issued at the request of the interested party on this 3rd day of October 2024.

Sincerely,

SEGURA PEREZ 'GNACIO - 02657928W

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