

# PhD Position in ICT and Structural Mechanics Groups (VAC-2021-22)

**Title of the PhD project:** Human-machine interaction for the engineering world

## INTRODUCTION:

The International Centre for Numerical Methods in Engineering (CIMNE, [www.cimne.com](http://www.cimne.com)) is a research centre, created in 1987 by consortium between the Catalan Government and the Universitat Politècnica de Catalunya (UPC-BarcelonaTech), devoted to the development and application of numerical methods to a wide range of areas in engineering. CIMNE has been selected as a Severo Ochoa Centre of Excellence for the period 2019-2023, the highest level of recognition of excellence and leadership awarded to a research centre in Spain.

## POSITION DETAILS

**Number of vacancies:** 1

**Category:** PhD (PHD2)

**Location:** Parc Mediterrani de la Tecnologia (Castelldefels)

**Yearly salary (gross):** 17.563,14 EUR

**Working hours:** Full time

**Duration:** 3 years

**Starting date:** No later than Sept 2021

## FUNCTIONS TO BE DEVELOPED BY THE APPLICANT

CIMNE is looking for a **PhD Researcher** to be part of the Research and Technical Development (RTD) Groups on ICT and Structural Mechanics.

The functions assigned to the candidate will be:

- Complete a PhD degree in an engineering program (ICT/Computer Science) at Universitat Politècnica de Catalunya – Barcelona Tech. The candidate is expected to complete the PhD thesis in a maximum of three years.
- Collaborate with various research groups within CIMNE and worldwide.
- To publish a minimum of two papers in JCR journals during the PhD period, author and co-author articles in high-impact international journals.
- Carry out quality research, training and management.
- Participate on the dissemination and outreach activities associated with the project.
- Participate in international conferences presenting her/his work.

## DESCRIPTION OF THE PHD PROJECT:

Motivation: development of applications for the construction sector through virtual reality technologies, new modes of visualization (stereoscopic and interactive screens) and handling of 3D models (evolution of the mouse), as new GUIs for other emerging technologies (digital twins, computer vision, internet of things, drones, cloud computing). The expected outcome of this work is a new framework to facilitate and automate the creation of mixed reality experiences for the AECO (Architectural, Engineering, Construction and Operations) sector, with the following components:

- (a) 3D models, based on the Building Information Modelling (BIM) ecosystem (models and software), N-dimensional;
- (b) ICT frameworks, communication, databases of models and objects, client/server architecture;
- (c) Arts, narratives and serious games to provide sense of purpose to the engineering tools;

Specific outcomes are the following:

- (a) Virtual reality learning pills;
- (b) Design tools for the building industry (safety, accessibility, maintenance, operations);
- (c) Plug-in to simulation programs;
- (d) Link to other data sources and technologies (sensors, cameras, computer vision);

## References

Mora, J.; Muñoz La Rivera, F.; Mercè, R.; Valero, I. (2020). Herramientas de apoyo a la creación de narrativas de riesgo en experiencias de realidad virtual. ORP Conference 2020, Colombia.

Muñoz-La Rivera, F., Mora-Serrano, J., Delgado, C., Jofré, C., Vera, R. y Núñez, T. (2020). La Narrativa en experiencias de Realidad Mixta para desarrollar cultura de prevención de riesgos laborales en construcción. VIII Convención Internacional de la Edificación, Ibiza, España.

Muñoz, F.; Mora, J.; Valero, I.; Oñate, E. (2/4). 2020. Methodological-technological framework for construction 4.0 Archives of computational methods in engineering. ISSN 1134-3060.

## REQUIREMENTS

1. Studies in ICT (Telecommunication/Computer engineering preferred), Civil Engineering or architecture.
2. Skills: programming (C#), frameworks, gaming, unity3d, client-server/rich client, databases.
3. Soft skills: high social skills, teamwork oriented, excellent communication skills, oral and written, good command of English.
4. An enthusiastic attitude to conduct research, being hard-working and critic.

## EVALUATION OF CANDIDATES

The requirements and merits will be evaluated with a maximum mark of 100 points. Such maximum mark will be obtained by adding up the points obtained in the following items:

- Academic record (30%)

- Previous research, academic or job experience in the field of the position (30%)
- Programming skills (25%)
- Soft skills (15%)

## HOW TO APPLY

Candidates must complete the "Application Form" form on our website, indicating the reference of the vacancy and attaching the following documents **in English**:

- Curriculum vitae
- A motivation letter
- Academic transcripts from all Undergraduate and MSc degrees
- Name and institutional contact information of two possible referees

The deadline for registration to the offer ends on 31<sup>st</sup> May, 2021 at 12 noon.

The shortlisted candidates may be called for an interview. They may also be required to provide further supporting documentation.

***CIMNE is an equal opportunity employer committed to diversity and inclusion. We are pleased to consider all qualified applicants for employment without regard to race, colour, religion, sex, sexual orientation, gender identity, national origin, age, disability or any other basis protected by applicable state or local law. CIMNE has been awarded the HRS4R label.***