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International Centre for
Numerical Methods in Engineering

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HR EXCELLENCE IN RESEARCH

JOB VACANCY ANNOUNCEMENT

VAC-2025-66 - Computational Cardiovascular Modelling

Number of places: 1

Category: PhD Student - PHD 1

Workplace: -   Barcelona, Campus Nord UPC.

　　　　　　　 -   Valladolid, UVa

Salary (gross): 24.468,15€ [1]

Weekly working hours: 40hrs/week

Contract type: PhD

Duration: 4 years

Planned start date: January 1st, 2026 [2]

Functions to be developed:

A doctoral thesis in the framework of the research project entitled INNOVECMO: Estudios Computacionales, Experimentales y de Prototipado para el Desarrollo de Sistemas Innovadores de Oxigenación Extracorpórea Sin Válvulas, with reference *Proje*ct *PID2024-158878OB-C21 funded by MCIN/AEI /10.13039/501100011033 and by FEDER, EU*. Principal investigators: Prof. Eduardo Soudah Pirieto y Joaquin Alberto Hernandez Ortega.

The Biomedical Engineering Group is seeking a motivated and enthusiastic PhD candidate to join our team. The research will focus on the numerical modelling and/or experimental study of an innovative cardiovascular device. The aim is to design and improve device performance using computational models (e.g., Finite Element Analysis or related methods). These models are increasingly important as decision-support tools in the preoperative phase. However, despite their high predictive power, they often demand substantial computational resources and time, which limits their routine clinical use. This project will address this challenge by developing fast computational models capable of accurately predicting the interaction between devices and the human body. The candidate will contribute to the creation of next-generation, clinically oriented simulations for cardiovascular devices, combining:

- Computational Biomechanics (CB): development of tools to capture the physics behind cardiovascular device.
- Physics-informed Machine Learning (ML): advanced AI methods designed to accelerate simulations while preserving the validity of underlying physical laws.

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[1] The annual salary will be 24,468.15€ for each of the four years.
[2] This date is subject to the adjustment of the final concession resolution.

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The ultimate goal is to deliver fast, accurate, and efficient tools to predict cardiovascular device behaviour under different physiological conditions. This will enable faster testing, more reliable surgical planning, and improved patient outcomes.

The research will be validated through specific clinical use cases, in close collaboration with experimental and clinical partners. The candidate participates in a coordinate project lead by CIMNE in collaboration with Universidad of Valladolid.

If you are passionate about biomechanics, numerical methods, and AI in biomedical engineering, this is an exciting opportunity to engage in cutting-edge research with real clinical impact.

Additional information about the project is available at: CIMNE RTD Project: INNOVECMO

The candidate will join the research group of: Bio-Medical Engineering

This contract is financed by the announcement of Proyectos de Generación de Conocimiento 2024 of the Ministerio de Ciencia, Innovación y universidades: Proyectos de Generación de conocimiento 2024| Agencia Estatal de Investigación (www.aei.gob.es)

We offer:

- Opportunity to join a dynamic, young research group with an interdisciplinary focus and strong track record of the topic of this research line.
- Clinical-oriented research with direct impact on patient care and clinical practice.
- Extensive collaboration opportunities with hospitals, clinical practitioners, and leading international research groups, enhancing the translational potential of research outcomes and promoting international networking.
- Development and dissemination of open-access computational tools and codes, including contributions to in-house platforms, such as, KRATOS Multiphysics, amongst others.

Required skills:

- The candidate must have a Master's degree (or equivalent) in Bioengineering, Aeronautical, Civil, or Mechanical Engineering, applied sciences or mathematics; and to be in disposition to be enrolled in a PhD programme in the moment of the contract's formalization.
- Good written and oral communication skills in English.
- Advanced programming skills (such as Python, Matlab, …).
- Hard-working and enthusiastic attitude towards research and innovation.
- Team work spirit.
- Knowledge on the Computational Cardiovascular dynamics (not mandatory)

Qualification system:

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The requisites and merits will be evaluated with a maximum note of 100 points (Minimum required of 90 points). The evaluation process must comply with the following criteria÷

1. Academic and/or scientific-technical background of the candidate (up to 20 points).
2. Scientific-technical contributions (up to 15 points). The candidate's academic record and other curricular merits will be evaluated, as well as their suitability to the tasks to be performed based on the candidate's training and professional experience.
3. Mobility and internationalization (up to 5 points). The relevance and impact of the candidate's stays in national and international centers and/or in the industrial sector on his/her research career will be assessed, taking into account the prestige of the entity receiving the stay and the activity carried out therein.
4. Criterion 2. Adequacy of the candidate to the research activities to be developed (up to 60 points). Personal interview. The suitability of the person to the program, project or research activities to be carried out will be assessed according to his/her previous training and experience. For this purpose, the added value that the completion of the project will represent for his/her research career will be taken into account, as well as the value contributed to the center and to the receiving team.

Candidates must complete the "Application Form" form on our website, indicating the reference of the vacancy and attaching the required documents.

The deadline for registration to the offer ends on October 16th, 2025 at 12 noon.

The preselected candidates may be requested to send the documentation required in the "Requirements" and "Merits" sections, duly scanned, and may be called to go through selection tests (which might be of eliminatory nature) and / or personal interviews.

*It is mandatory to provide the CV in the official form of the Spanish Ministry, which can be downloaded from the following link: https://www.cimne.com/cvdata/cntr2/spc2/dtos/mdia/People/CV-abreujat.pdf

Commitment to inclusivity:

At CIMNE, we champion workplace equity, diversity, and inclusion. We're committed to fostering a culture where everyone can thrive, leveraging diverse talents and backgrounds. We welcome all applicants regardless of color, religion, gender, origin, abilities, gender identity, sexual orientation, pregnancy or any other characteristic. Join us in building a community that values, celebrates, and respects every individual.

Quota Reservation:

In line with our commitment to inclusion, we reserve a percentage of our workforce for people with disabilities. We especially encourage these individuals to apply.

HR Excellence in Research:

CIMNE welcomes and supports the principles of European Commission's *European Charter for*

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Researchers and the *Code of Conduct for the Recruitment of Researchers*, embracing a transparent, attractive, and open labour market in research. The centre's Human Resources Strategy for Researchers (HRS4R) includes an action plan with actionable short and long-term actions to support a high-quality working environment for all. Further information can be found *here* .

Reference to the research project funded by