

JOB OFFER

PhD Researcher

Position: Predoctoral. Thermal Storage Integration – Component Modelling and Design
Offer date: WEB publication
Project: CIIAE – Refª PD-INTEGRACIÓN, MODELADO Y DISEÑO DE COMPONENTES - ALMACENAMIENTO DE ENERGÍA TÉRMICA
Department: Thermal Energy Storage
Estimated starting date: First quarter of 2024

Workplace:	Campus University of Extremadura, Cáceres (Spain).	
Tasks to be developed:	<p>The integration of new thermal energy storage materials for residential applications, industrial processes and/or centralized generation, requires the development and design of specific components for this purpose (tanks, heat exchangers, reactors, etc.), taking into account both the characteristics of materials, as well as integration into the complete system. The candidate will join the thermal energy storage group at CIIAE and develop his doctoral thesis within this field.</p> <p>The selected profile must develop the following tasks:</p> <ul style="list-style-type: none"> • Conceptual, preliminary and advanced design of new components for integration in thermal storage plants for residential, industrial and/or centralized generation applications (e.g. tanks, heat exchangers, reactors). • Development of physical models of energy storage components in static and/or dynamic regime, based on phenomena such as thermodynamics, heat transfer, mass transfer, porosity of materials, phase change, multiphase and chemistry. • Preliminary design based on simplified ODE/DAE models (0D,1D). • Advanced design based on CFD models (2D/3D). • Experimental validation and calibration of models in collaboration with the CIIAE prototyping group. • Development of strategies to guarantee the requirements of energy demand processes (e.g., temperature, capacity and power) • Development of fast derived models via ROM and/or meta-modelling. • Automation of design routines via scripting (MATLAB/Python) • Design scaling. • Must work in intragroup collaboration at both materials' science level and storage systems level. • Possibility of specialising in one of the following thermal storage technologies: phase change materials, solids, thermochemical or molten salts. • Close interdisciplinary collaboration with other CIIAE groups and colleagues. • Support and tutoring final degree projects and/or master's students • Writing scientific publications and presenting results at international conferences. <p>Challenges:</p> <ul style="list-style-type: none"> • Conceptual design of new components for thermal storage. • Preliminary and advanced design of new components for thermal energy storage. • Development and validation of simplified and advanced models of thermal energy storage components. • Ensure component design objectives (e.g., temperature, capacity, power, energy density, cost of stored energy). • Interactivity with materials science and system integration levels. • Design optimization based on cost functions (energy and/or economic). • Applied research, aimed at residential, industrial, and/or centralized generation processes. 	
Duration of the contract and salary (per annum):	Fixed-term contract. End: September 2025. Possibility of extension.	Gross Salary: 19,065.34 €

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Academic background required:	Degree in Mechanical Engineering, Industrial Engineering, Chemical Engineering, Applied Physics, or equivalent. Meet the requirements to access a doctoral program. Note: If the candidate is finishing the master's degree (or the doctoral access qualification) you can apply for admission to this position. The title will be required on the date of signing the contract.		
Other education:	Valuable master's degree in - Thermal energy storage - Design of thermal equipment - Thermofluids - Industrial engineering		
Professional experience:	NA		
Job requirements (have to be fulfilled):	Specific techniques (analytical, software, calculations, prototyping, etc.)	<ul style="list-style-type: none"> • Design of components for the thermal storage of sensible, latent, and/or thermochemical heat. • Simplified models for designing based on heat and mass transfer balances. • Advanced models for detailed design based on thermodynamics, fluid dynamics, heat transfer, phase change, multiphase, porous media, chemistry. • Simplified static/dynamic simulation (ODE/DAE) • Advanced static/dynamic simulation (CFD) • Experimental validation, in collaboration with experimentalist from the prototyping group • Automation of design routines. • Design optimization • To be valued: Knowledge of Python, Matlab, Simulink, Modelica, Ansys, Optislang and/or equivalent 	
	Participation and/or collaboration in R&D&I/business projects	-NA	
	Languages	-English. Valuable Spanish and Portuguese	
	Cross-cutting competences	<ul style="list-style-type: none"> - Creativity - Initiative and enthusiasm - Interdisciplinarity - Communication skills - Ability to work as a team - Ability to work independently on supervision - Experience in collaborations inside and outside the work department - Organization 	
	Willingness to travel and stay abroad	-The offered position requires occasional participation in events outside the Extremadura region.	
	Publications: scientific articles (in journals indexed in Web of Science and/or Scopus), theses (PhD and/or Master's), presentations at conferences, reports, technical reports, technical guides, etc.	-NA	
To be evaluated (adds points to the final evaluation)			

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- Motivation Letter: Include a motivation letter that describes the skills that the candidate considers suitable for the position, as well as general objectives of the research that he or she would like to develop at CIIAE.
- Letters of reference: Include a professional reference letter (example from final degree or master's project coordinator), with their contact information, email and telephone number) that highlights the technical and transversal skills identified in the candidate that are relevant to the position.
- Have completed specific training courses relevant to the offered position.
- Experience in modelling based on physical transport phenomena (mass, energy, etc.)
- Experience in designing thermal energy storage components.
- Experience in modelling and simplified simulations (ODE/DAE) (Matlab, Simulink, Modelica, or equivalent)
- Experience in advanced modelling and simulations (CFD) (Ansys or equivalent)
- Experience in industrial collaborations and/or previous experience working in the industry
- Final degree project linked or close to the required topics.
- Final master's project linked or close to the required topics.
- Scientific and/or conference publications.
- Patents.
- Awards, mentions or other achievements

Note: To facilitate the evaluation, it is recommended to include a simplified summary list or table that breaks down the candidate's merits that are considered relevant for each of the requirements.

TECHNIQUES: Oral knowledge test YES NO X

LANGUAGE: ORAL YES X NO

It will be evaluated during the interview.

JOB INTERVIEW: YES X NO

Interested candidates

Please, send all the documents requested by the terms and conditions of the call for proposals, together with all the documents requested by this job offer, and the Application Form. Deadline is 15 calendar days from the day following the publication in the CIIAE web, and indicating the following reference: **Ref^a PD-INTEGRACIÓN, MODELADO Y DISEÑO DE COMPONENTES - ALMACENAMIENTO DE ENERGÍA TÉRMICA**

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