



CHAIR OF RENEWABLE ENERGIES

Master's Research Grant (PhD) - 12 vacancies

20 of September of 2023

A call for tenders is open for twelve Scholarship's for master within the scope of the projects: **NEXUS** - Pacto de Inovação – Transição Verde e Digital para Transportes, Logística e Mobilidade (Reference C645112083-0000059); **H2DRIVEN** Green Agenda (Reference C644923817-00000037) and **ATE** - Aliança para a Transição Energética (Reference C644914747-0000023), financed by national funds through the "Agendas Mobilizadoras para a Inovação Empresarial" through the "Programa Recuperação e Resiliência (PRR)", and project **SaltoPower** - European facility on Molten SALT technologies TO power and energy system applications, (Reference 101079303) and for project Sol2H2O - European Twinning for research in Solar energy to (2) water (H2O) production and treatment technologies (Reference 101079305), financed by national funds through the "Comissão Europeia" under the following conditions:

Scientific area:

SCHOLARSHIP	DOMAIN	AREA	
Scholarship 1	Engineering Sciences	Electrical, Electronic and Computer Engineering, Other	
	and Technologies	Engineering Sciences and Technologies	
Scholarship 2	Engineering Sciences	Electrical, Electronic and Computer Engineering, Other	
	and Technologies	Engineering Sciences and Technologies	
Scholarship 3	Engineering Sciences	Electrical, Electronic and Computer Engineering, Other	
	and Technologies	Engineering Sciences and Technologies	
Scholarship 4	Engineering Sciences	Electrical, Electronic and Computer Engineering, Other	
	and Technologies	Engineering Sciences and Technologies	
Scholarship 5	Engineering Sciences	Electrical, Electronic and Computer Engineering, Other	
	and Technologies	Engineering Sciences and Technologies	
Scholarship 6	Engineering Sciences	Mechanical Engineering, Other Engineering Sciences and	
	and Technologies	Technologies	
Scholarship 7	Engineering Sciences	Chemical Engineering, Other Engineering Sciences and	
	and Technologies	Technologies	
Scholarship 8	Engineering Sciences	Mechanical engineering, Other engineering sciences and	
	and Technologies	technologies	
Scholarship 9	Engineering Sciences	Physics, Mechanical Engineering, Other Engineering Sciences	
	and Technologies	and Technologies.	
Scholarship 10	Engineering Sciences	Chemical Engineering, Environmental Engineering,	
	and Technologies	Environmental Biotechnology, Other Engineering Sciences and	
		Technologies	
Scholarship 11	Engineering Sciences	Mechanical Engineering, Environmental Engineering,	
	and Technologies	Environmental Biotechnology, Other Engineering Sciences and	
		Technologies	











Scholarship 12	Engineering Sciences	Electrical, Electronic and Computer Engineering, Mechanical	
	and Technologies	Engineering, Environmental Engineering	

Admission requirements:

Base requirements:

Master's degree in Engineering in the area(s) related to the topic (required)

Attendance of a PhD Program in a field related to the topic (to be verified by the start date of the Scholarship)

As an alternative to the previous requirement, attendance of a non-degree course related to the work plan foreseen in the scholarship, with the obligation to enroll in a doctoral program related to the topic at the end of the course (to be verified by the start date of the scholarship) Proficiency in English (spoken and written)

Preferably proficiency in Portuguese (spoken and written)

Specific requirements

Scholarship 1	Land use compatibility in agro-voltaic solar installations: optimized solar design, compatibility with agricultural activity, operation and maintenance	
Requirements	 Familiar with photovoltaic systems and technologies. Experience in modeling and simulating photovoltaic systems. Preferably with knowledge of non-standard photovoltaic systems and photovoltaic irrigation systems, quality control and production indicators for photovoltaic systems. Experience in testing and experimental methodologies for photovoltaic systems. Familiar with methodologies for making photovoltaic plants compatible and integrating them into the landscape. Good command of programming languages and experience in using mathematical simulation software (preferably Matlab, Python and Labview). 	
Scholarship 2	Performance models of electrochemical storage technologies for hybrid electric storage systems	
Requirements	 Familiar with electrochemical electrical energy storage technologies. Experience in modeling and simulating electrochemical batteries. Preferably with knowledge of developing and testing management strategies for battery systems and photovoltaic generation. Experience in the characterization and experimental testing of battery systems. Good command of programming languages and experience in using mathematical simulation software (preferably Matlab, Python and Labview). 	
Scholarship 3	Optimized design of photovoltaic systems with electrical storage for the logistics sector of large ports	
Requirements	 Familiar with techniques and procedures for repairing photovoltaic modules and electrical energy storage technologies. Familiar with electroluminescence inspection of low-cost photovoltaic modules. This is a qualifying condition. Preferably with knowledge and experience in the areas of photovoltaic energy systems, electrical energy storage systems and applications. Good command of programming languages and experience in using mathematical simulation software (preferably Matlab, Python and Labview). 	











Scholarship 4	Optimized design, modelling, monitoring and simulation of floating photovoltaic systems	
Requirements	 Familiar with modeling and simulation of photovoltaic systems and power electronics. Familiar with the methodology for evaluating floating photovoltaic plants, data analysis and assessing the national potential of this technology. This is an eliminating condition. Preferably with knowledge and experience in the areas of photovoltaic energy systems, electrical energy storage systems and applications. Good command of programming languages and experience in using mathematical simulation software (preferably Matlab, Python and Labview). 	
Scholarship 5	Study and design of floating offshore photovoltaic systems	
Requirements	 Familiar with modeling and simulation of photovoltaic systems and degradation models. Familiar with the methodology for evaluating photovoltaic plants, analyzing production data and calculating system indicators. Experience in implementing and developing experimental testing and sensing methods for photovoltaic systems. Preferably with knowledge and experience in the areas of photovoltaic energy systems, electrical energy storage systems and applications. Good command of programming languages and experience in using mathematical simulation software (preferably Matlab, Python and Labview). 	
Scholarship 6	Design, construction and experimental testing of a Carnot battery with thermal storage in molten salts	
Requirements	 Familiarity with thermodynamics, thermal conversion and/or thermal energy storage equipment and systems; Preferably with experience in thermal energy storage systems for CSP applications and Carnot batteries; Experience in modeling, simulating and carrying out techno-economic evaluations of thermal systems; 	
Scholarship 7	evaluations of thermal systems; Study and competitive analysis of thermochemical storage technologies for industrial applications	
Requirements	 Knowledge of the principles and applications of energy storage technologies, especially relating to thermochemical energy storage. Experience in experimental heat transfer in complex systems. Preferably with research experience in the field of high temperature thermochemical storage systems or closely related area. Experience with experimental techniques, data analysis and interpretation relevant to energy storage systems. Familiarity with modeling and simulation tools. 	
Scholarship 8	Experimental testing and evaluation of the operation of a molten salt thermal storage system and analysis of its integration into Carnot Batteries or industrial applications	
Requirements	 Training in renewable energy systems and thermal storage systems; Preferably with knowledge of Carnot batteries; Preferably with experience in research activities in the field of solar thermal energy and/or thermal energy storage; Preferably with experience of testing renewable energy systems on a laboratory scale or in the field; Experience in modeling, simulation and carrying out techno-economic evaluations. 	
Scholarship 9	Design and optical evaluation of "Beam Down" point concentration systems for application in industrial processes with high temperature thermal storage	











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Requirements	 Explicit training in Concentrated Solar Power (CSP) and solar thermochemistry. Knowledge of the design and numerical simulation of point-source concentrating solar power systems of the Tower Plant type. Good command of programming languages and experience in the use of mathematical simulation software (preference given to Python) as well as experience in the use of ray tracing software (preference given to TracePro, SolTrace and Tonatiuh). 	
Scholarship 10	Tratamento de águas residuais por fotocatálise solar	
Requirements	• Experience in the physical-chemical and microbiological characterization of water.	
Scholarship 11	Solar desalination in "Zero Liquid Discharge" concept	
Requirements	 Knowledge of thermodynamics and mass and heat transfer processes; Knowledge of separation and/or evaporation processes; Knowledge and experience in the operation of heat exchangers; Knowledge and experience in the operation of pressure exchangers; Knowledge of hydraulics and pumping. 	
Scholarship 12	Definition and technical-economic assessment of energy and water production and supply systems for isolated and/or autonomous energy communities	
Requirements	 Knowledge of how solar systems work to produce electricity and heat; Knowledge of the operation of systems for storing electricity and heat; Knowledge of how energy communities work; Proficiency in programming languages and experience in using numerical simulation software. Attendance of a doctoral program or alternatively attendance of a non-degree course in an area related to the topic of the scholarship. Proficiency in English. 	

As set forth FCT Research Scholarship Regulation No. 950/2019 of December 16, 2019, article 3 and 6, candidates for "**BI**" (Research Grants) must comply as a rule condition for the award of the scholarship, the effective inclusion in study cycles leading to the attribution of academic degrees or in courses not leading to an academic degree. Courses that do not confer an academic degree correspond to the courses provided for in subparagraph e) of paragraph 3 of article 4 of Decree-Law No. 74/2006 of 24 March and must be developed in a higher education institution in association with at least one R&D unit, including a course plan in one or several research areas of the unit.

Work plan:

Scholarship 1	Land use compatibility in agro-voltaic solar installations: optimized solar design, compatibility with agricultural activity, operation and maintenance	
Work plan	 Analysis of the legal framework in Europe for agro-voltaic applications Design, implementation and monitoring of demonstrators and test infrastructures for agro-voltaic applications Modeling and simulation of agro-voltaic systems Development of application compatibility strategies and composite evaluation methodology Analysis and production of technical documentation on agro-voltaic applications 	
Scholarship 2	Performance models of electrochemical storage technologies for hybrid electric storage systems	
Work plan	 Analysis of the legal framework for photovoltaic and electrical energy storage applications. 	











	 Development of battery system models, in monotechnological configuration or in hybrid systems. 	
	 Study, analysis and definition of energy storage assets for the Port of Sines t sector. Analysis and production of technical documentation relating to the energy stafacilities to be developed as part of the project. 	
	 Support in the acquisition, commissioning, monitoring and data analysis of batter storage facilities, for reports to project partners and others. 	
Scholarship 3	Optimized design of photovoltaic systems with electrical storage for the logistics sector of large ports	
Work plan	Analysis of the legal framework for photovoltaic and energy storage applications;	
•	 Study, analysis and definition of energy storage assets for the pilot project. 	
	Analysis and production of technical documentation relating to the energy storage	
	installation to be developed as part of the project.	
	• Support in the acquisition, commissioning, monitoring and data analysis of the	
	battery storage installation, for reports to project partners and others.	
Scholarship 4	Optimized design, modelling, monitoring and simulation of floating photovoltaic systems	
Work plan	 Analysis of the legal framework for floating photovoltaic and energy storage applications; 	
	 Support in the study, analysis and definition of the pilot plant and its auxiliary systems. 	
	• Support in developing the monitoring, control and data acquisition methodology for the floating photovoltaic plant.	
	• Analysis and production of technical documentation relating to the floating	
	photovoltaic plant to be developed as part of the project.	
	 Development of models for floating photovoltaic systems and their experimental validation. 	
	• Support in the acquisition, commissioning, monitoring and analysis of data from the floating photovoltaic plant, for reports to project partners and others.	
Scholarship 5	Study and design of floating offshore photovoltaic systems	
Work plan	 Analysis of the legal framework for floating photovoltaic applications in offshore or near offshore areas and integration with other renewable energy generation or storage assets. 	
	 Development of a study to analyze and determine the potential of this technology. 	
	 Support in the development of testing methodology and validation of critical 	
	parameters for offshore floating photovoltaic technology.	
	 Analysis and production of technical documentation relating to offshore floating photovoltaic installations. 	
	 Development of models for floating photovoltaic systems and test methodology for experimental validation. 	
	 Support in the acquisition, commissioning, monitoring and analysis of floating photovoltaic plant data, for reports to project partners and others. 	
Scholarship 6	Design, construction and experimental testing of a Carnot battery with thermal storage in molten salts	
Work plan	 Applied research into Carnot battery systems, including design, operation, modeling and optimization. 	
	• Design and development of experimental setups to evaluate the performance and	
	 efficiency of the Carnot battery demonstration. Analysis and interpretation of experimental data to identify areas for improvemental data to i	
	and optimize system performance.	
Scholarship 7	Study and competitive analysis of thermochemical storage technologies for industrial applications	











Work plan	• Literature review on thermochemical storage systems, focusing on materials, reaction kinetics and thermodynamic properties.		
	• Development of a comprehensive mathematical model and simulation of the		
	 thermodynamic behavior and reaction kinetics of a thermochemical storage syste Design and configuration of experimental equipment to study thermochemic 		
	storage reactions.		
	• Development of a technical-economic model of the thermochemical storage system.		
Scholarship 8	Experimental testing and evaluation of the operation of a molten salt thermal storage		
	system and analysis of its integration into Carnot Batteries or industrial applications		
Work plan	Carrying out experimental work to evaluate thermal losses and testing		
	charge/discharge cycles in a thermal energy storage (TES) prototype.		
	• Evaluation of the performance of the TES system in relation to the reference results		
	of the molten salt system, including analysis of thermal losses during daily and		
	seasonal operation, degradation over the cycles and effective heat transfer		
	coefficients during the charging and discharging processes.		
	 Development of a techno-economic model of the TES system. 		
Scholarship 9	Design and optical evaluation of "Beam Down" point concentration systems for application		
	in industrial processes with high temperature thermal storage		
Work plan	Modeling and optimization of a point-focus solar concentrator of the Central Tower		
	type with a beam-down approach coupled to a thermal storage system with Al/Si		
	metallic phase change material (PCM);		
	Accompanying and supporting all procurement, installation, commissioning and		
	experimental operation activities for the system to be implemented.		
	• Comparison and production of technical documentation relating to the results		
	obtained by numerical and experimental simulation		
<u> </u>	Support in writing research proposals aligned with the topics covered.		
Scholarship 10	Wastewater treatment by solar photocatalysis		
Work plan	 Carrying out tests to evaluate the efficiency of the solar reactor in water treatment; 		
	Carrying out laboratory analyses of physical-chemical and microbiological parameters to avaluate the order residue in under treatment		
	to evaluate the solar reactor pilot in water treatment;		
	 Analysis of the state of the art in the use of solar energy in water treatment; Development of a technical economic model of the water treatment system using 		
	 Development of a technical-economic model of the water treatment system using color operation 		
	solar energy; Participation in the project's knowledge discomination and transfer activities:		
	 Participation in the project's knowledge dissemination and transfer activities; Technical visite to the Sol2H2O project partners' facilities. 		
Scholarship 11	Technical visits to the Sol2H2O project partners' facilities.		
Scholarship 11	Solar desalination in "Zero Liquid Discharge" concept		
Work plan	Accompanying and supporting all procurement installation commissioning and		
	 Accompanying and supporting all procurement, installation, commissioning and experimental experimental experimentation experimental experimental experimental experimental exp		
	experimental operation activities for the solar desalination system;		
	experimental operation activities for the solar desalination system;Analysis and production of technical documentation relating to the solar desalination		
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Scholarshin 17	 experimental operation activities for the solar desalination system; Analysis and production of technical documentation relating to the solar desalination system to be implemented; Participation in the technical and economic assessment of the solar desalination system to be developed as part of the project. 		
Scholarship 12	 experimental operation activities for the solar desalination system; Analysis and production of technical documentation relating to the solar desalination system to be implemented; Participation in the technical and economic assessment of the solar desalination system to be developed as part of the project. Definition and technical-economic assessment of energy and water production and supply 		
	 experimental operation activities for the solar desalination system; Analysis and production of technical documentation relating to the solar desalination system to be implemented; Participation in the technical and economic assessment of the solar desalination system to be developed as part of the project. Definition and technical-economic assessment of energy and water production and supply systems for isolated and/or autonomous energy communities 		
Scholarship 12 Work plan	 experimental operation activities for the solar desalination system; Analysis and production of technical documentation relating to the solar desalination system to be implemented; Participation in the technical and economic assessment of the solar desalination system to be developed as part of the project. Definition and technical-economic assessment of energy and water production and supply systems for isolated and/or autonomous energy communities Conceptualization of energy supply in the form of electricity and heat in isolated, off- 		
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	 experimental operation activities for the solar desalination system; Analysis and production of technical documentation relating to the solar desalination system to be implemented; Participation in the technical and economic assessment of the solar desalination system to be developed as part of the project. Definition and technical-economic assessment of energy and water production and supply systems for isolated and/or autonomous energy communities Conceptualization of energy supply in the form of electricity and heat in isolated, off-grid communities, in order to make them self-sufficient; Simulating the operation of isolated, off-grid communities in order to guarantee energy self-sufficiency; 		
	 experimental operation activities for the solar desalination system; Analysis and production of technical documentation relating to the solar desalination system to be implemented; Participation in the technical and economic assessment of the solar desalination system to be developed as part of the project. Definition and technical-economic assessment of energy and water production and supply systems for isolated and/or autonomous energy communities Conceptualization of energy supply in the form of electricity and heat in isolated, off-grid communities, in order to make them self-sufficient; Simulating the operation of isolated, off-grid communities in order to guarantee energy self-sufficiency; Monitoring energy community implementation projects, especially in off-grid 		
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	 experimental operation activities for the solar desalination system; Analysis and production of technical documentation relating to the solar desalination system to be implemented; Participation in the technical and economic assessment of the solar desalination system to be developed as part of the project. Definition and technical-economic assessment of energy and water production and supply systems for isolated and/or autonomous energy communities Conceptualization of energy supply in the form of electricity and heat in isolated, off-grid communities, in order to make them self-sufficient; Simulating the operation of isolated, off-grid communities in order to guarantee energy self-sufficiency; Monitoring energy community implementation projects, especially in off-grid 		











Applicable legislation and regulations: The granting of the Research Scholarship will be carried out upon the signing of a contract between the University of Évora and the scholarship holder, as set in the template <u>former.fct.pt/apoios/Minuta Contrato Bolsa.docx</u>, pursuant to the Research Scholarship Statute (Law No. 40/2004 of August 18 and Decree-Law No. 123/2019 of August 28) and in accordance with the legislation and Regulation of Research Grants of the Foundation for Science and Technology, IP in force, regulation nº950/2019 of December 16, 2019: <u>https://files.dre.pt/2s/2019/12/241000000/0009100105.pdf</u> and other applicable rules.

Place of work: The work will be developed at Renewable Energies Chair at the Polo da Mitra of the University of Évora, under the scientific guidance following researchers:

SCHOLARSHIP/S	Scientific Guidance
S1- Land use compatibility in agro-voltaic solar installations:	Doctor Luís Fialho
optimized solar design, compatibility with agricultural activity,	
operation and maintenance	
S2 - Performance models of electrochemical storage technologies	Doctor Luís Fialho
for hybrid electric storage systems	
S3 - Optimized design of photovoltaic systems with electrical	Doctor Luís Fialho
storage for the logistics sector of large ports	
S4 - Optimized design, operation and maintenance requirements	Doctor Luís Fialho
and definition of related areas for floating solar photovoltaic	
installations	
S5 - Study and design of floating offshore photovoltaic systems	Doctor Luís Fialho
S6 - Design, construction and experimental testing of a Carnot	Doctor Radia El Cadi
battery with thermal storage in molten salts	
S7 - Study and competitive analysis of thermochemical storage	Doctor Radia El Cadi
technologies for industrial applications	
S8 - Experimental testing and evaluation of the operation of a	Doctor Radia El Cadi
molten salt thermal storage system and analysis of its integration	
into Carnot Batteries or industrial applications	
S9 - Design and optical evaluation of "Beam Down" point	Doctor Diogo Canavarro
concentration systems for application in industrial processes with	
high temperature thermal storage	Doctor Maria Helena Novais
S10 - Wastewater treatment by solar photocatalysis	
S11 - Solar desalination in "Zero Liquid Discharge" concept	Doctor Pedro Horta
S12 - Definition and technical-economic assessment of energy and	Doctor Afonso Cavaco
water production and supply systems for isolated and/or	
autonomous energy communities	

Duration of the scholarship(s): The scholarship will have a duration of 12 months, starting on January of 2024. The scholarship contract may be renewed up until the end of the funding project's budget allocation.

Amount of monthly maintenance allowance: The amount of the scholarship corresponds to € 1 199,64, according to the table of scholarships awarded directly by FCT, I.P. in Portugal (<u>https://www.fct.pt/wp-content/uploads/2023/02/Tabela-de-Valores-SMM_2023.pdf</u>), payments being made monthly, by check or bank transfer.

Selection methods: The selection methods to be used will be the following:

• curriculum evaluation (100%)











If deemed necessary by the jury, for additional clarification or tie-breaking purposes, the first two candidates for each grant may be called for a selection interview.

If an interview is used, the evaluation will be as follows:

- curriculum evaluation (85%)
- interview (15%)

Composition of the Selection Jury:

President - Pedro Horta (Coordinating Researcher - Renewable Energies Chair) 1st Jury Member - Luís Fialho (Senior Researcher - Renewable Energies Chair) 2nd Jury Member - Afonso Cavaco (Researcher - Renewable Energies Chair) 3rd Jury Member - Diogo Canavarro (Assistant Researcher - Renewable Energies Chair) 4th Jury Member - Radia Ait El Cadi (Researcher - Renewable Energies Chair) 5th Jury Member - Maria Helena Novais (Researcher - Renewable Energies Chair) 1st Substitute - Paula Martins (Invited Research Assistant - Renewable Energies Chair) 2nd Substitute - Frederico Felizardo (Invited Research Assistant - Renewable Energies Chair)

Advertising/notification of results: The final results of the evaluation will be publicized, through an ordered list by final grade obtained posted in a visible and public place at the University of Évora Renewable Energies Chair at the Polo da Mitra, being the candidate (a) approved notified through email.

To ensure the right of prior hearing of interested parties, the Final Classification project will be announced by any written means to all interested parties.

After communicating the provisional list of the results of the evaluation, candidates have a period of 10 working days to express their opinion in a preliminary hearing of interested parties.

Application deadline and submission of applications: The tender is open from <u>26 of September</u> <u>of 2023 to 31 of October of 2023</u> and the results of the selection will be published by <u>13 of</u> <u>November of 2023</u>.

Applications must be formalized, obligatorily, by sending an application letter with the following documents: Curriculum Vitae, certificate of qualifications, reference or recommendation letters and other supporting documents considered relevant.

For the purposes of application, the evidence may be replaced by a declaration of honor signed by the candidate, but the failure to demonstrate that evidence, in the contracting phase, possession of the required degree on the deadline for application or the non-presentation of proof of enrollment in the study cycle or non-degree course, for scholarships with this component, imply the cancellation of the candidate's application.

Academic degrees obtained in foreign countries require registration by a Portuguese Institution in accordance with Decree-Law no. 66/2018, of August 16 and Ordinance No. 33/2019, of January 25th.







The presentation of the certificate is mandatory for the signing of the contract. More information can be obtained at: <u>https://www.dges.gov.pt/pt/pagina/recognition?plid=374</u>

Applications must be sent by email to:

Renewable Energies Chair at the University of Évora e-mail: <u>catedraer@uevora.pt</u> Subject: Application for a Master's Degree (PhD) CER





