

# MSCA Postdoctoral Fellowships 2023

Attractive Research opportunities  
in Extremadura -Spain-



European  
Commission



Marie Skłodowska-Curie Actions  
Research Fellowship Programme

*Freedom of scientific research / Internationalization / Prestige / Economic resources*

## HOSTING OFFER

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### “Quantum Computing applications”

#### Supervisor (Researcher at UEX):

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**Juan Manuel Murillo Rodríguez**

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(<https://dblp.org/pid/m/JuanManuelMurillo.html>)

My academic career began in 1994 at the University of Extremadura (UEX) where I am currently a Full Professor in the field of Software Engineering. Throughout these years I participated in more than 30 competitive research projects (funds exceeding 3.5M euros, leading 7 of them for an amount of 1.65M). I have also developed extensive collaboration with private companies in more than 20 contracts (2.5M euros, leading 13 of them for an amount of 1.7M). This allowed me to be worthy of four six-year research periods, one more for transfer activities and the Award of Excellence for the Transfer of Research Results from the UEX in 2020. All this activity is developed within the Quercus Software Engineering Group that I contributed to found under the direction of Prof. Juan Hernández Núñez. Currently, I lead one of the group's laboratories, the SPILab (Social and Pervasive Innovation Lab) which integrates 18 members of the Quercus group.

During the firsts years my research focused on Advanced Separation of Concerns (Aspects) and their application to self-adaptive systems. Since 2012, the SPILab team has specialized in building distributed, service-oriented architectures for mobile applications. Our main contributions have been the Internet of People (IoP) concept and the People as a Service (PeaaS) architecture. Both promote considering mobile devices as an infrastructure integrated in the cloud in which services can be deployed. The ultimate goal is for mobile devices to offer services on their owners, including those of connecting to the IoT minimizing the owner intervention. This concept was one of the precursors of the need for what we know today as Fog and Mist Computing. Thus, the latest work that we develop in this area deals with the optimization of the deployment of mobile applications considering the infrastructure from the cloud to the edge, fog and mist. In all this research, the application areas were that of health and aging being our main contribution the MIAPE system. Conceived for assessing the level of aging in the elderly it is running in more than 50 nursing homes in the region of Alentejo (Portugal). Finally, the practical problems faced in the field of health have led us, since 2019, to open a new research direction related to the development of software for quantum systems and its integration with classical service-oriented ones.

Regarding Knowledge transfer, the most important contribution is the foundation with José Manuel García Alonso and José Javier Berrocal Olmeda of the startup GLOIN in 2010 which still keep running and growing. In 2012, the company won the Launchpad Denmark, a competition where more than

200 companies from all over the world participated. GLOIN was introduced with the nimBees tool based on PeaaS. Motivated by the advances in our application areas we recently founded a new startup (HAT - Health and Ageing Tech.)

All of the above activity has been combined with several management activities. Thus, in the period 2007-2010 I was Vice-rector of Information Technology and Communications at the University of Extremadura. This position provided me with experience in the management of large computing and communications infrastructures. During the period 2019-2022 I founded and headed the European Projects Office of the University of Extremadura, which has provided me with very good relations and knowledge of the SECTI (Sistema Extremeño de Ciencia, Tecnología e Innovación). Finally, since June 2022, I am in charge of the COMPUTAEX foundation, for which I have proposed a project for the improvement and growth of research results and knowledge transfer and integration with the University of Extremadura. This foundation manages the regional supercomputing center and is also member of the RES ICTS network (Spanish Supercomputing Network).

## **What we offer (Research support):**

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Research facilities, networking possibilities, external relations ...

The candidate will be hosted at the Extremadura Supercomputing, Technological Innovation and Research Center (<https://www.cenits.es/en>) located in Cáceres (Worlds Heritage City). The center, managed by the Computing and Advanced Technologies Foundation of Extremadura (COMPUTAEX), operates an infrastructure made up of several supercomputers recognized as a unique infrastructure in the Spanish research system. The center provides services to the research system of the region and the country as part of the Spanish Supercomputing Network.

COMPUTAEX is a foundation fully committed to research and knowledge development. It employs a team of researchers who carry out work in various fields of technology, such as the Cloud Continuum, Quantum Service Oriented Computing, Artificial Intelligence, Cybersecurity or HPC code efficiency, as well as in various application areas, such as pharmacogenomics and personalized medicine, aging and wellness or precision agriculture. Thus, CenitS can offer a network of collaborations that include the centers and researchers of the Spanish Supercomputing Network, the research teams of the University of Extremadura and research teams of other Spanish universities such as University of Málaga, University of Seville, Polytechnic University of Valencia, Polytechnic University of Catalonia, and others. The center's researchers also maintain collaborations with foreign universities such as the University of Bologna, the University of Pisa, the University of Helsinki, TU Wien, Florida University, the University of Texas at Austin, etc.

Candidates are welcome to join any of the research projects developed by CenitS, as well as to propose and develop his/her own ideas with the support of the center.

## **Project idea/position (scientific requirements, topic, discipline):**

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Although CenitS is not closed to any idea, researchers interested in quantum computing applications, the development of technology to support quantum services and AI applications in the field of health, biotechnology or biology are especially welcome.

Even when it is still unknown what the quantum computing systems of the future will look like, there are already some facts that we can say about them: They will be hybrid systems in which pieces of classical software that will run on conventional computers will interact with pieces of quantum software that will run on quantum computers. In addition, the development of such systems will be guided by the general principles of Service Oriented Computing (reusability, maintainability, scalability, ...). Today, even when there already exist some real quantum computers, support for providing quantum software as a service or quantum infrastructure as a service is still very poor. CenitS is committed to the development of this technology that will form the basis of Future HPC. The areas of application in which CenitS develops these technologies are Health and Pharmacogenomics.

## **What we expect from you (requirements, preferences):**

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We prefer a **European Fellowship** application.

Furthermore, you should:

- Have a PhD degree at the time of the deadline for applications (**13/09/2023**).
- At the call deadline, you must not have more than 8 years full-time equivalent experience in research, measured from the date of award of the doctoral degree
- Have not been in Spain for more than 12 months in the 3 years before the call deadline.
- Your profile should comply with the requirements identified in the call. Please, visit [call text](#) and read requirements carefully.

### **Documents to be submitted and deadline**

Applicants should submit his/her CV and a letter of motivation latest until **May 15<sup>th</sup> 2023**, to [amelia.aguilar@fundecyt-pctex.es](mailto:amelia.aguilar@fundecyt-pctex.es) with subject line **MSCA-PF-2023 - Hosting Offer Cenits**

# Why Extremadura and our University?

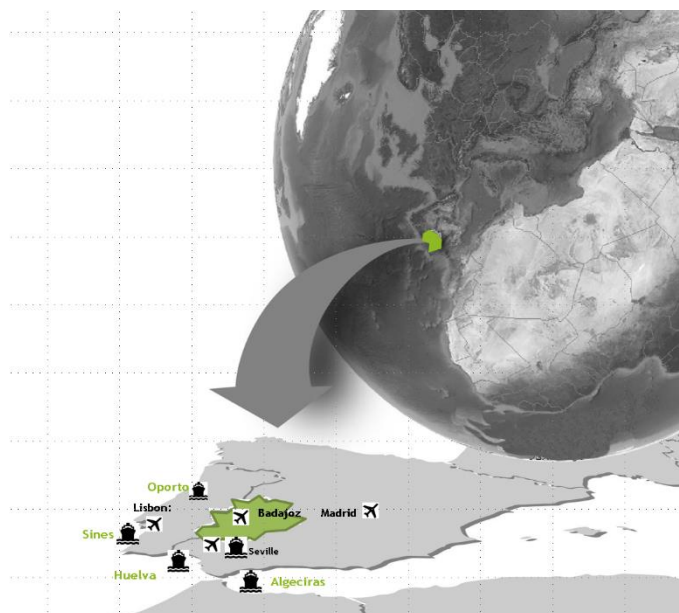
## REGIONAL PROFILE

The Region of Extremadura is an Autonomous Community located in the southwest of Spain, bordered by Portugal. In particular, its proximity to cities such as Madrid, Seville and Lisbon constitutes a geostrategic advantage.

Extremadura covers a total area of 41,634 square kilometres, being the fifth largest region in Spain, with 8.1% of the total Spanish territory.

In terms of natural resources, Extremadura has an **outstanding biodiversity**, with more than 30% of its territory under some sort of environmental protection, and one of the largest reservoir of fresh water in Spain. In this geographical and demographic context, the region has a clear **rural imprint**.

Thanks to its climate conditions, renewable energy makes Extremadura a **national leader in electricity production with solar technology, specially thermo solar energy**, being Extremadura the second producer region in Spain, and has a **biomass potential** of more than 6.8 million tons per year. The latest data (2018) indicate that renewable energy production has reached 24.8% of regional energy production. This figure means that the region is in 7th position among the Autonomous Communities in terms of clean energy production.



The dispersed and aging population has contributed to develop a **very efficient network of health, education and administrative infrastructure**. In fact, the social services in Extremadura are used as a model of good practise for regions showing similar characteristics.

Tourism is also gaining prominence thanks to the **natural and historical heritage**, and the free software is among the key segments of the regional Information and Communication Technologies (ICT).

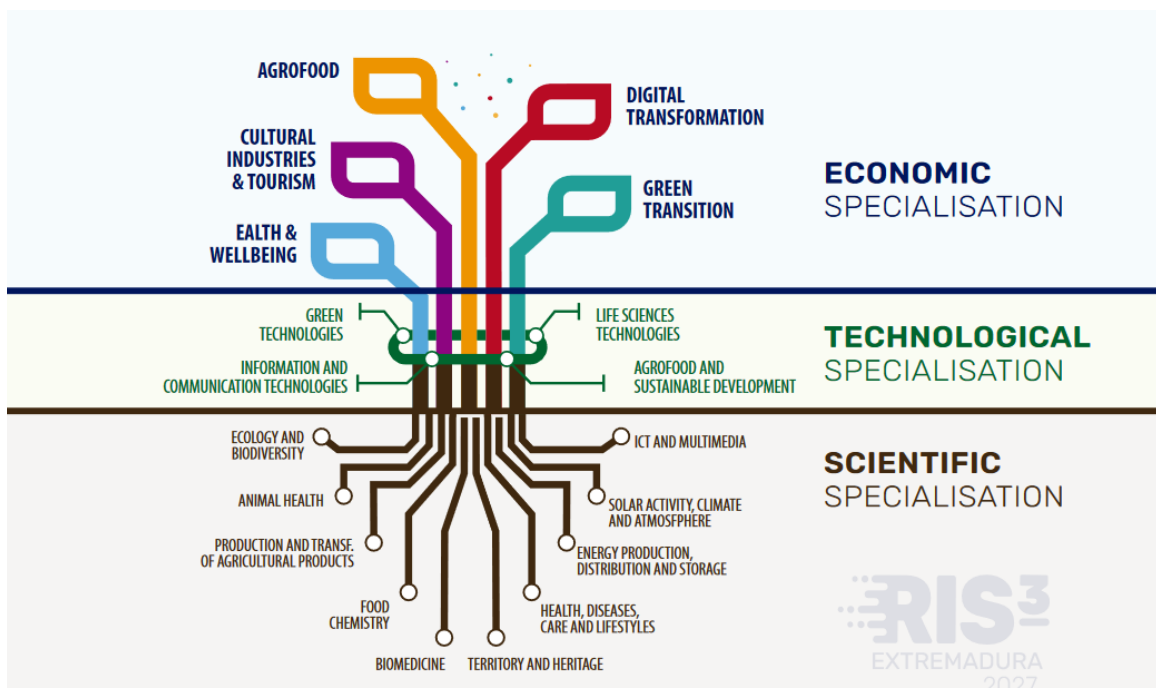
## RESEARCH, DEVELOPMENT AND INNOVATION

Spain is a highly decentralised country. Its regions are responsible for Research, Development and Innovation (R&D&I) policies and are in charge of university funding. According to this, the Regional Government (“Junta de Extremadura”), through the General Secretary of Science, Technology, Innovation and University, is responsible for coordinating **the System of Science, Technology and innovation of Extremadura (SECTI)**, which is articulated on the basis of the Extremadura Law of Science (Ley 10/2010), and for implementing policies and programmes to support research, development and innovation in the region.

The SECTI is the framework in which regional R&D&I stakeholders operate and collaborate, integrating agents that generate knowledge (as the University of Extremadura and other research and technology centres), intermediary (mainly public) bodies and regional companies.

### RIS3 2021-2027

The **smart specialisation pattern of Extremadura** describes the scientific, technological and business capabilities in which the region is best positioned:



The RIS3 Extremadura 2027 has been designed in connection with existing policies and strategies at international, national and regional level, as a roadmap to **make Extremadura an exporting region of products and services with its own brand and high added value, with the aim of moving towards a green and digital transition** capable of exploiting our resources and capacities in a sustainable way, making the region an attractive destination for investment and talent. The RIS3 Extremadura 2027 is the result of a participatory governance process and the outcome of a shared and consensual vision with companies, researchers, public administrations, policymakers, citizens and other relevant stakeholders **in the social and economic development of the region.**

**UNIVERSITY OF EXTREMADURA: The fundamental agent in the field of knowledge and talent generation for the region, and internationally well connected for your research.**

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**The Faculty of Sports Sciences, number 28 in the world according to the Shanghai Ranking:**

The Faculty of Sports Sciences of the University of Extremadura has experienced a notable rise in the 2021 Global Ranking of Sport Science Schools and Departments, reaching number 28 in this prestigious world ranking (last year it ranked 50).

**Two researchers from the UEX in the world list of most cited scientists:** Antonio Plaza and Mario Estévez continue to rank as the most influential researchers, according to the world-renowned list of highly cited researchers published by Clarivate.

**Antonio Plaza** is university professor at the Polytechnic School of Cáceres. His work focuses on the efficient processing of hyperspectral images of the earth's surface, obtained by satellites and other remote earth observation platforms. He is a **Fellow member of the Institute of Electrical and Electronics Engineers (IEEE)** and coordinator of the "Hyperspectral Computing" (HyperComp) research group of the Department of Computer and Communications Technology, University of Extremadura. He has been **Editor-in-Chief of the IEEE Transactions on Geoscience and Remote Sensing and IEEE Journal on Miniaturization for Air and Space Systems**, as well as coordinator of various national and international projects. **He has published more than 340 articles** in impact journals, being **selected as a Highly Cited Researcher in 2018, 2019, 2020 and 2021 by Clarivate Analytics.**

**Mario Estévez** is full professor at the Faculty of Veterinary Medicine of Cáceres and Coordinator of the Food Technology research group of the IPROCAR Research Institute of the University of Extremadura. His current work focuses on the impact of diet on oxidative stress and intestinal health, a subject on which he leads a research project in which doctors and nurses from the digestive system service of the University Hospital of Cáceres collaborate. **He is a recognized international expert on the impact of food oxidation on quality and safety.** He has participated in many international conferences and has taught and supervised the work of researchers from the US, Canada, China, Finland, Belgium, Denmark, Portugal, Italy, Brazil, Argentina, Mexico, among

many other countries. He has written **more than 160 scientific articles** and is editor of prestigious scientific journals in the area of Food Science & Technology & Nutrition. He has been **recognized as one of the most influential researchers in his field** (Highly Cited Researcher) in the years 2020 and 2021 by Clarivate Analytics.

Our research groups (G.I.) and projects conduct multidisciplinary research across institutional boundaries. The activity developed by the Research Groups is carried out in a wide variety of scientific-technological areas. An important part of these research areas is aligned with the areas of specialization of the Region, such as: Agri-food (Biology, Biotechnology, Production technologies, Meat products); Clean energies (Energy transition, Natural resources, Dehesa); Health (Health Technologies, Biosanitary); Tourism (Culture); ICT (Information and Communication Technologies).

In addition to the G.I. of the UEX, there are also Research Groups under the figure of mixed Research Groups. Additionally, the Research Institutes of the UEX, "are specialized centers dedicated to research related to science, technique and technology, as well as human and social sciences and artistic creation".

#### **LIST OF UNIVERSITY RESEARCH INSTITUTES AT UEX:**

- 1) **i-PAT** - Heritage Research University Institute
- 2) **IACYS** - University Institute for Research on Water, Climate Change and Sustainability
- 3) **IBPM** - University Institute of Biomarkers of Molecular Pathologies
- 4) **ICCAEX** - Institute for Advanced Scientific Computation
- 5) **IMUEX** - Institute of Mathematics of the University of Extremadura
- 6) **INBIO G+C** - University Institute of Livestock and Hunting Biotechnology
- 7) **INDEHESA** - Dehesa University Institute of the University of Extremadura
- 8) **INPEX** - University Institute of Research and Educational Prospection
- 9) **INTERRA** - University Research Institute for Sustainable Territorial Development
- 10) **INTIA** - University Institute for Research in Applied Computer Technologies
- 11) **INUBE** - University Institute of Biosanitary Research of Extremadura
- 12) **INURA** - University Institute for Agricultural Resources Research
- 13) **IPROCAR** - Meat and Meat Products Research Institute
- 14) **LINGLAP** - University Research Institute in Linguistic and Applied Languages of the UEX



These centers are aimed at facilitating collaboration between researchers and access to scientific infrastructure. They also carry out knowledge and technology development and application activities in collaboration with the region's business fabric.

The UEX has **specialized infrastructures** to support the transfer from the SECTI research teams to companies, such as the **Management and Transfer of Research Results Service (SGTRI)**, and the **European Projects Office (OPE-UEX)**, giving support for the internationalization. As an example, the connection with the following EU Network:

**ERRIN** - European Regions Research & Innovation Network, a well-established platform based in Brussels with more than 125 regional organisations. The network focuses exclusively on research and innovation policy and funding programs, as well as project development.

**ERIAFF** - Network of European Regions for Innovation in Agriculture, Food and Forestry, an informal association of regional Authorities. The Network is currently participated by 50 member Regions and 38 observers from 21 European countries.

**UNILION** - Universities Informal Liaison Offices Network, an informal network of 49 Brussels-based liaison offices representing more than 150 excellent universities from Europe and Japan.

**EURAXESS** - Researchers in Motion, a unique pan-European initiative providing information and support services to professional researchers. EURAXESS supports the mobility of researchers and professional development, while enhancing scientific collaboration between Europe and the world. The OPE, through FUNDECYT Science and Technology Park of Extremadura (FUNDECYT-PCTEX), is integrated into this network as a regional node for Extremadura.

**CORAL** - Community of Regions for Assisted Living, an informal network of European regions on active and healthy ageing.

**EURADA** - European Association of Development Agencies, gathers professionals working on economic development across Europe. EURADA represents development agencies before the European Union institutions.

**SERN** - Startup Europe Regions Network, a European network of regional stakeholders committed to inspire a culture of start-up-friendly regions. SERN offers a unique interconnected space for collaboration between regional authorities, innovation and development agencies, universities, and associations dedicated to support entrepreneurship and start-up growth across Europe.

**EBN** - European Business and Innovation Centre Network, is a not-for-profit that serves a pan-European, global community of people that use innovative business as a driver for regional (economic) development.