

# 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

---

**“Development and deployment of digital human activity tracing systems in environments of cultural tourist interest.”**

## Supervisor (Researcher at UEX):

---

**Fernando Javier Álvarez Franco**

**Full Professor at the Department of Electrical Engineering, Electronics and Automation and Head of the Sensory Systems Research Group**

He has led two research projects funded by the European Commission, six projects funded by the Spanish Government and three projects funded by the Regional Government of Extremadura. He has supervised six doctoral theses, two of them with the mention of international doctorate, and is currently supervising two more. He is currently a Senior Member of the IEEE and Vice-chair of the IEEE Instrumentation and Measurement Spanish Chapter.

## What we offer (Research support):

---

### Research facilities:

Our group has a laboratory in the Physics building at the Faculty of Science and a testing room at the university research institutes building. In these facilities we have basic electronic and computing equipments to design embedded digital systems based on microcontrollers and Systems-on-chip, as well as specific equipment for the development of sensory systems based on ultrasonic, BLE, visible light and millimeter wave radar technologies.

### Networking possibilities and external relations:

At a national level, we have participated in five collaborative research projects together with groups from the university of Alcalá, the university of Valladolid, the university Jaume I and the Spanish Council for Scientific Research. We have also participated in three networks of excellence on the topic of local positioning and navigations systems and their applications, together with other nine research groups from different national institutions. One of these collaborative projects (PID2021-122642OB-C42) and networks of excellence (RED2022-134355-T) are currently active.

At an international level, we have participated in two Interreg-POCTEP projects together with the Secretariat of Culture of the Junta de Extremadura, the Municipality of Elvas and the archaeological site of Mértola (0246\_LIMUS\_4\_E and 0794\_ECLIMUS\_4\_E). The latter one is currently active and led by our group. We have also participated in two COST actions (TU1306 and CA18110), as member of the executive board in the former one. We maintain an active research collaboration with groups from the Universities of Yale (USA), Antwerpen (Belgium) and Queen Mary (UK).

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

---

**Main project idea:** Development and deployment of digital human activity tracing systems in environments of cultural tourist interest.

**Summary:** Human activity monitoring systems are the result of the combination of three disruptive digital elements whose development has been boosted in recent years: Local Positioning Systems (LPS), Human Activity Monitoring Sensors (HAMS) and Machine Learning (ML) techniques. These types of systems make it possible to continuously and automatically determine the location of their users, their pose and parameters that characterize their physical activity, such as speed of movement, heart rate and respiratory rate. All this information can be used to provide users with a location-based service through their own mobile terminal, such as an intelligent guide that displays information about nearby points of interest, a navigation service that identifies the least congested routes, or the activation of geo-referenced games that propose different activities to participants depending on their position in the environment and their physical condition. On the other hand, this information can be used by the managers of the environment to analyze in detail the behavior and reactions of users, identify patterns and anomalies in this behavior and make predictions about their preferences. The main application of human activity tracking systems today is in the field of health telecare, to continuously monitor patients outside health centers and thus anticipate possible risks or worsening and automate simple tasks by reducing the number of trips of these patients or their caregivers. However, the potential of these systems within the cultural tourism sector seems evident as a powerful tool that allows, as mentioned above, to collect information on the behavior of its visitors in a continuous and automated way, as well as to make predictions about this behavior if they are provided with certain analytical capabilities based on artificial intelligence.

**Involved disciplines:** ICTs, Tourism

**Scientific requirements:** Electronic Engineering (embedded systems and SOC design, wearable sensors design), Telecommunications Engineering (wireless communications networks), Computer Science (machine learning, edge computing)

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

---

Our preference would be to participate in 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 - UEX Hosting Offer 3**

# Why Extremadura and our University?

## REGIONAL PROFILE

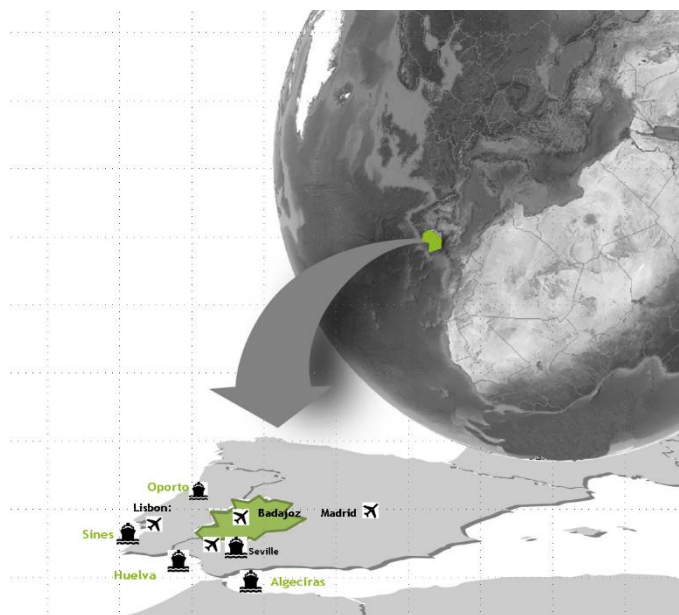
---

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).

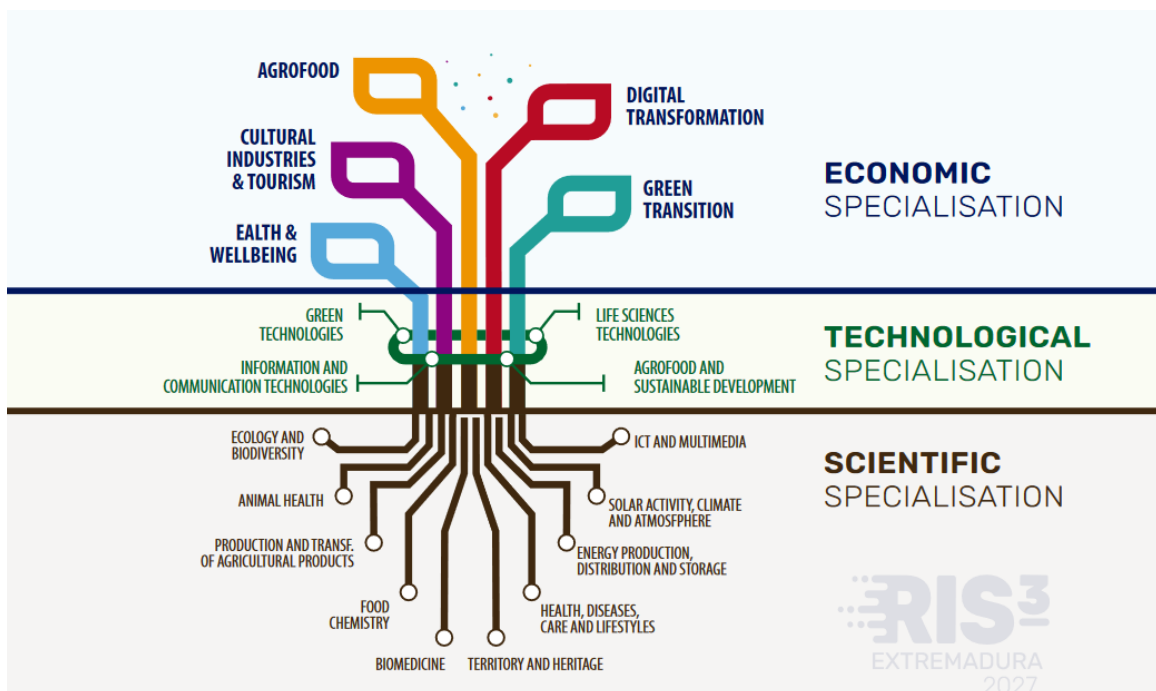
## RESEARCH, DEVELOPMENT AND INNOVATION

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.**

---

**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.