ANNEX II.1

Project Reference	Project Title	Pre-doctoral grant reference for application
PID2024-155489OB-I00	TOWARDS A LESS POLLUTING ENERGY SYSTEM IN AVIATION: AMMONIA FUEL BLENDS AND SAFS COMBUSTION INTERMEDIATES	PREP2024-002383

Principal investigator 1 of the project: María Abián Vicén

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Principal investigator 2 of the project: María Ujue Alzueta Anía

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Scientific lines of the project in which the thesis would be framed

Group research line: **Fuel conversion and emission minimisation**.

Scientific lines of the project:

Experimental study of the conversion process of NH_3 mixtures with sustainable aviation fuel (SAF) combustion intermediates such as acetaldehyde, acetone and acetic acid under different operating conditions (temperature, oxygen/fuel ratio, pressure and mixture composition) relevant to aviation.

Development and validation of kinetic-chemical reaction mechanisms for describing and predicting the conversion process of NH_3mixtures and SAFs intermediates under conditions of interest to the aeronautical industry.

Assessment of the generation of atmospheric pollutants, especially nitrogen oxides, as well as possible synergies for reducing pollutant emissions.

Assessment of the potential use of NH_3/SAF mixtures as a clean, low-carbon combustion technology for reducing the environmental impact of air transport.

ANNEX II.2

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-159766OB-I00	DEVELOPMENT AND CHARACTERISATION OF KINEMATIC MODELLING AND COMPENSATION TECHNIQUES BASED ON ARTIFICIAL INTELLIGENCE FOR ROBOTS AND ARTICULATED COORDINATE MEASUREMENT ARMS (ROBOKIM)	PREP2024-002588

Principal investigator 1 of the project: Raquel Acero Cacho

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Principal investigator 2 of the project: Jorge Santolaria Mazo

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Scientific lines of the project in which the thesis would be framed

The pre-doctoral contract will focus on developing advanced techniques for kinematic modelling and error compensation in articulated coordinate measuring arms and industrial robots, through the integration of neural networks and artificial intelligence algorithms to generate a digital twin.

Research lines:
1.1 Machine Tool and Robot Metrology
1.2 Contact/non-contact inspection and measurement systems. Artificial vision and artificial intelligence

The GIFMA research group (https://i3a.unizar.es/es/grupos-de-investigacion/gifma) works on the development, optimisation and automation of innovative manufacturing and inspection techniques and systems. With extensive experience in collaborating with industry, it offers a multidisciplinary and dynamic environment in which new members can participate in a wide range of academic and research activities.

ANNEX II.3

Project Reference	Project Title	Pre-doctoral grant reference for application
PID2024-155903OB-I00	TRANSFORMATION OF VEGETABLE BY-PRODUCTS INTO VALUE-ADDED INGREDIENTS USING POSTHARVEST ABIOTIC STRESS TECHNOLOGIES	PREP2024-002747

Principal investigator 1 of the project: Esther Arias Álvarez

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Scientific lines of the project in which the thesis would be framed

The main objective of the project is to evaluate the effectiveness of different post-harvest abiotic stress technologies (physical damage and light stress (UV-B and UV-C)) applied individually or in combination as potential methods for revaluing *Brassica* genus by-products and converting them into high value-added ingredients.

The scientific lines of the project within which the thesis will be framed are:

a) Identification of the most interesting compounds in *Brassica* genus by-products (broccoli and broccolini) by studying their metabolic profile: differences between commercial crops (broccoli) and local native crops (broccolini). This general line includes the following specific sub-lines:

a.1. Agronomic and morphological characterisation of plant material.
a.2. Study of the metabolic profile of different types of by-products and identification of compounds of interest.

b) Optimisation and selection of post-harvest abiotic stress technology that allows greater induction of *de novo* synthesis of secondary metabolites. This general line includes the following specific sub-lines:

b.1. Influence of physical damage stress on the synthesis of health-promoting compounds.
b.2. Influence of physical light stress (UV-B and UV-C) on the synthesis of health-promoting compounds.

c) Study of the role of oxidative stress markers and enzymes involved in the plant response to stress (immediate, medium and late): selection of an oxidative stress indicator. This general line includes the following specific sub-lines:

c.1. Effect of physical damage stress on plant defence mechanisms: role of oxidative stress markers and enzymes involved in stress response (immediate, medium and late).
c.2. Effect of light stress (UV-B and UV-C) on the defence mechanism of plants: role of oxidative stress markers and enzymes involved in the stress response (immediate, medium and late).

ANNEX II.3

d) Development of a new enriched food ingredient from *Brassica* genus by-products: study of its suitability in a cereal-based food matrix. This general line includes the following specific sub-lines:

d.1. Obtaining the enriched ingredient and physical-chemical characterisation.
d.2. In vitro simulated digestion studies to evaluate the functional properties of the enriched ingredient.
d.3. Incorporation of selected by-products as functional ingredients in a cereal-based food product.

ANNEX II.4

Project reference	Project title "Performing Space / Spatialising Performance: Space and Performance in 21st Century Cinema"	Pre-doctoral grant reference for application
PID2024-155365NB-I0	PERFORMING SPACE/SPATIALISING PERFORMANCE: SPACE AND PERFORMANCE IN 21ST CENTURY CINEMA	PREP2024-003155

Principal investigator 1 of the project: María del Mar Azcona Montoliu

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Principal investigator 2 of the project (if applicable): Celestino Deleyto Alcalá

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Scientific lines of the project in which the thesis would be framed

Within the field of transnational cinema, this project explores the construction of filmic space in a corpus of 21st-century films, in particular, the way in which filmic space relates to real places. As part of this overall objective, this pre-doctoral contract will study the different ways in which characters and actors contribute to the construction of filmic space and the way in which these filmic spaces interact with the real places used in the films.

ANNEX II.5

Project Reference	Project title	Reference for pre-doctoral grant for application
PID2024-160041OB-I00	MULTIMODAL STRATEGIES FOR ROBUST HEALTH MONITORING USING BIOMARKERS WITH WEARABLE DEVICES. A STEP TOWARDS PREVENTIVE MEDICINE.	PREP2024-003093

Principal investigator 1 of the project: Raquel Bailón Luesma

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Principal investigator 2 of the project: Eduardo Gil Herrando

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Scientific lines of the project in which the thesis would be framed

This doctoral thesis is part of the research project **"Multimodal Strategies for Robust Health Monitoring using Biomarkers with Wearable Devices: A Step Towards Preventive Medicine (Bio-SHeRPaW)**". The main objective is to develop advanced and robust systems for health monitoring using biomarkers obtained through *wearable* devices, with a specialised focus on the analysis of the autonomic nervous system.

The research work will be structured around three fundamental areas: i) study and analysis of wearable devices, specifically aimed at monitoring sleep disorders and depression; ii) signal processing and technical implementation for efficient integration into low-power devices (on-device processing); and iii) clinical validation in cohorts of real patients to ensure its transfer to the healthcare setting.

The doctoral student's training plan will be interdisciplinary and will combine signal processing techniques and artificial intelligence.

The candidate will join the BSICoS (Biomedical Signal Interpretation and Computational Simulation) research group at the University of Zaragoza, which belongs to the Aragon Engineering Research Institute (I3A), the Aragon Health Research Institute (IIS Aragón), and the Biomedical Research Network Centre in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN), whose main objective is to increase the impact of ICTs in health applications through the development of physiology-guided methods for biomedical signal processing for the personalised interpretation (diagnosis, prognosis and treatment) of diseases and conditions of the cardiovascular, respiratory and autonomic nervous systems, primarily.

In addition, the project team involved in the thesis is highly interdisciplinary and international, involving leading hospitals in the fields of application (Miguel Servet University Hospital, Lozano Blesa Clinical Hospital, Parc Sanitari Sant Joan de Deu), as well as

as internationally renowned collaborators in the field of wearable devices and signal processing (University of Connecticut, University of Cambridge, Kaunas University of Technology, University of Eastern Finland).

ANNEX II.6

Project reference	Project Title	Pre-doctoral grant reference for application
PID2024-160104OB-I00	INNOVATIVE APPROACHES TO UNDERSTANDING AND MITIGATING PRION DISEASES THROUGH THE EVALUATION OF ZOONOTIC POTENTIAL, GENE THERAPY AND IN VITRO MODELS	PREP2024-002502

Principal investigator 1 of the project: Rosa María Bolea Bailo

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Principal investigator 2 of the project: Alicia Otero García

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Scientific lines of the project in which the thesis would be framed

Study of the zoonotic potential of prions responsible for chronic wasting disease (CWD) in cervids

Transmissible spongiform encephalopathies (TSEs) are fatal neurodegenerative diseases caused by prions, misfolded conformations of the cellular prion protein (PrP^C). Among them, chronic wasting disease (CWD) affects various species of deer and has a high capacity for spread and environmental persistence, making it difficult to control and eradicate.

CWD is widely distributed in North America, with high prevalence in both wild and captive populations. Since 2016, multiple cases have been detected in northern Europe (Norway, Sweden and Finland), affecting species such as reindeer, deer and elk, raising concerns about its potential zoonotic risk. Experimental studies have shown that European CWD isolates differ from North American ones and may have different biological properties.

Recent results from the research team indicate that certain European isolates of CWD may increase their capacity for interspecies transmission after passing through intermediate hosts that express ovine prion protein, thus increasing their zoonotic potential. This phenomenon is particularly relevant from a public health perspective, given its parallel with the origin of the bovine spongiform encephalopathy crisis.

General objective of the line of research

To evaluate the zoonotic potential of the prions responsible for European cases of CWD through transmission studies in animal models.

Experimental strategy

ANNEX II.6

- Intracerebral inoculation of European CWD isolates into transgenic mouse lines expressing human prion protein, including the main polymorphic variants.
- Study of the potential for transmission both by direct passage and after adaptation of the isolates in intermediate hosts.
- Use of transgenic models expressing ovine or bovine prion protein to evaluate changes in the transmission and adaptation capacity of the prion agent.

This line of research will enable the characterisation of the zoonotic risk of emerging CWD in Europe and provide key information for animal and public health.

ANNEX II.7

Project reference	Project title	Reference for pre-doctoral assistance for application
PID2024-155886NB-I00	DENSITY RECONSTRUCTIONS, DEFORMATIONS, APPEARANCE AND SEMANTIC CHANGES TO ADVANCE VISUAL SLAM.	PREP2024-003128

Principal investigator 1 of the project: Javier Civera Sancho

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Scientific lines of the project in which the thesis would be framed

Recognition of places with changes in appearance *(T3). The thesis will first address the development of continuous cost functions (T3.1) to train place recognition models from images. After that, it will address the learning of representations with a higher level and precision in their geometric information (T3.2).*

Topometric maps in colonoscopies *(T5.4). Finally, the above developments will be applied to the estimation of topometric maps in colonoscopies, re-training on specific colonoscopy data.*

ANNEX II.8

Project Reference	Project Title	Pre-doctoral grant reference for application
PID2024-157905OB-C21	SCIENTIFIC AND TECHNICAL CONTRIBUTIONS TO THE DEVELOPMENT OF HIGH-QUALITY AROMATIC PRODUCTS WITH LOW OR NO ALCOHOL CONTENT DERIVED FROM GRAPES AND WINE	PREP2024-002771

Principal investigator 1 of the project: Vicente Ferreira González

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Principal investigator 2 of the project: Ana María Escudero Carra

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Scientific lines of the project in which the thesis would be framed

1. *Study of the chemical and sensory characteristics of NOLO wines to identify the chemical and sensory bases of sensory imbalances in these products. Sensory definition of the perception of vinosity.*

2. *Understanding of the chemical and physical-chemical changes associated with industrial dealcoholisation processes and their relationship with the sensory properties of the final product.*

3. *Study of the role of alcohol in the volatility of odourants, to obtain clues about aromatic persistence both on the nose and in the mouth.*

4. *Evaluation of the effects associated with the ageing of NOLO matrices in terms of the enhancement of the varietal aromatic fraction.*

5. *Evaluation of the potential associated with aromatic phenolic extracts obtained directly from grapes.*

ANNEX II.9

Project reference	Project title	Reference for pre-doctoral grant for application
PID2024-155384OB-C21	INVESTIGATING THE ROLE OF THE MECHANICAL MICROENVIRONMENT IN THE EFFECTIVENESS OF CAR-T IMMUNOTHERAPY: MICROFLUIDIC AND COMPUTATIONAL MODELLING (CARTIMEC)	PREP2024-002903

Principal investigator 1 of the project: José Manuel García Aznar

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Principal investigator 2 of the project: Alejandra González Loyola

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Scientific lines of the project in which the thesis would be framed

- *Agent-based simulation or discrete models*
- *Computational modelling combining finite elements and agents*
- *Digital twin of in vitro and in vivo experiments*
- *Mechanical immunotherapy*

ANNEX II.10

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-155426OB-I00	SIMULATION OF MECHANICAL INTERACTIONS BETWEEN BACTERIA AND HOST CELLS IN 2D TO 3D MONOLAYERS UNDER PHYSIOLOGICAL CONDITIONS (BACHOMEC)	PREP2024-003020

Principal investigator 1 of the project: María José Gómez Benito

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Scientific lines of the project in which the thesis would be framed

1. Cellular mechanobiology.
2. Mechanics of bacterial infections.
3. Finite element simulation and agent models.
4. Cell segmentation and model adjustment using artificial intelligence techniques
5. Analysis and processing of cell microscopy images.
6. Modelling of the mechanics of bacterial-infected and non-infected cell monolayers.

ANNEX II.11

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-156670OB-I00	MAGNETIC NANOACTUATORS FOR TORQUE-MEDIATED DISREGGRATION OF PROTEIN AGGREGATES IN LOW-FREQUENCY MAGNETIC FIELDS	PREP2024-003115

Principal investigator 1 of the project: Gerardo F. Goya Rossetti

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Scientific lines of the project in which the thesis would be framed

• Development of magnetic nanoactuators (MNA) for magnetomechanical action in pathological protein aggregates. Synthesis and characterisation of MNA under conditions compatible with biological experimentation.
• Surface functionalisation of MNAs with recognition ligands.
• Modelling of the coupling and disaggregation mechanism.
• Instrumentation applied to the design of an electromagnetic applicator and optical instrumentation for in situ monitoring.
• Structural characterisation of actuators and aggregates by electron microscopy (ICTS ELECMI/LMA), spectroscopic techniques and morphology analysis.

ANNEX II.12

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-159848NB-I00	GENDER AWARENESS AMONG FEMALE ARTISTS IN SPAIN, 1900-1968. ICONOLOGY AND THEORY.	PREP2024-002679

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Scientific lines of the project in which the thesis would be framed

Main scientific lines

1. Contemporary art history. Gender studies. Cultural studies

The backbone of the project, focused on the analysis of artistic production, professional projection and gender commitment of women artists throughout contemporary history.

This line of research focuses on the critical review of artistic and theoretical historiography, the recovery of contemporary female creators, and the analysis of their careers and, essentially, their poetics and theory. It also aims to establish a contextualisation with what has happened in Europe.

2. Visual representation, identity and symbolic construction of gender

This line of research is dedicated to the study of the visual and theoretical poetics developed by contemporary artists, focusing on the processes of symbolic, iconographic and discursive construction of gender. It includes the analysis of stereotypes and visual and theoretical models perpetuated by historiography, as well as the response of the creators themselves.

3. Artistic heritage, cultural memory and gender perspective

This line focuses on research, conservation and interpretation of artistic and literary heritage created by female artists from a gender perspective. It encompasses both the study of collections, archives and artistic holdings and the recovery of silenced memories, proposing new inclusive and critical interpretations of heritage.

ANNEX II.12

Cross-cutting and applied lines

4. Museography, curatorial practices and exhibition discourses

A cross-cutting line that analyses and proposes museographic models with a gender perspective. It studies institutional discourses, curatorial strategies and exhibition narratives, promoting practices that contribute to equality, diversity and inclusion in museums and academies, institutions and cultural centres.

5. Artistic education, dissemination and social transfer of knowledge

Aimed at applying research results in diverse educational and social contexts. It includes the development of teaching materials, training programmes, outreach activities and transfer actions that integrate gender equality into the teaching and dissemination of art history and female artistic and theoretical creation.

6. Interdisciplinary methodologies and feminist theoretical approaches

Methodological approach underpinning the entire project, integrating theoretical and methodological tools from feminist studies, social history, literature and cultural studies, reinforcing the scientific rigour and innovation of the research approach.

ANNEX II.13

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-155485OB-I00	ELECTRONIC POWER GENERATORS WITH ARBITRARY WAVEFORM AND HIGH FREQUENCY	PREP2024-003102

Principal investigator 1 of the project: Óscar Lucía Gil

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Principal investigator 2 of the project: Héctor Sarnago Andía

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Scientific lines of the project in which the thesis would be framed

Design and simulation of high-performance electronic power converters. Development of electromechanical prototypes of electronic power converters.

Study and application of electronic power converters to induction heating, electric vehicle and biomedical applications.

ANNEX II.14

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-158322OB-I00	EGOCENTRIC PROBABILISTIC AND MULTIMODAL PERCEPTION FOR INTELLIGENT AND PERSONALISED VISUAL ASSISTANCE	PREP2024-003132

Principal investigator 1 of the project: Rubén Martínez Cantín

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Principal investigator 2 of the project: José J. Guerrero

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Scientific lines of the project in which the thesis would be framed

Artificial intelligence, and more specifically machine learning and computer vision methods, are set to revolutionise assistive devices, such as aids for blind or visually impaired people. The research group has been a leader in this type of technology for several years, specifically in the prediction and inference of affordances (possible actions that the user can perform in the environment based on their abilities and needs), SLAM (Simultaneous Localisation and Mapping) and reinforcement learning.

In this thesis, we will consider the problem of constructing semantic and affordance maps using our multimodal deep learning and Bayesian pipeline to construct implicit maps (similar to NeRFs or Gaussian Splatting) combining geometry and semantics. We will also extend these mapping capabilities in real time using SLAM (Simultaneous Localisation and Mapping) techniques. Finally, we will use the maps and localisation to guide the user using reinforcement learning methods based on user preferences and reinforcement learning for assistance.

The results will be integrated and evaluated in a visual assistance and prosthetics simulator available to the group using virtual reality glasses.

Main lines:

- Deep learning for semantic and affordance prediction
- Reinforcement learning for assistance
- Semantic and affordance SLAM
- SLAM using implicit models (NeRFs and Gaussian Splatting)
- Simulation of visual prostheses with virtual reality

ANNEX II.15

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-160207NB-I00	PHYSIOLOGICAL, MORPHOLOGICAL AND ECOLOGICAL RESPONSE OF LARGE MAMMALS TO CLIMATIC EVENTS IN THE UPPER CENOZOIC BASED ON THE IBERIAN FOSSIL RECORD	PREP2024-002651

Principal investigator 1 of the project: Daniel de Miguel Cascán

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Principal investigator 2 of the project: Beatriz Azanza Asensio

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Scientific lines of the project in which the thesis would be framed

1. Response of artiodactyl mammals to climate change events.
2. Cranial anatomy, functional morphology and evolution under conditions of environmental instability in Miocene artiodactyls.

ANNEX II.16

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-158833OB-I00	IBERIA AS A REFUGE FOR VERTEBRATE FAUNA THROUGHOUT TIME	PREP2024-002647

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Principal investigator 2 of the project: Ainara Badiola Kortabitarte

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Scientific lines of the project in which the thesis would be framed

The doctoral thesis would mainly fall within two lines of research of the project:

1) the fragmentation of Pangaea and the role of the Iberian Peninsula as a connection between Africa, South America and Eurasia during the Late Jurassic–Early Cretaceous transition; 2) the faunal replacement of the Early Cretaceous and its relationship with Gondwanan faunas.

Iguanodontian dinosaur faunas of the Lower Cretaceous of the Iberian Peninsula, palaeoecology, ontogeny and development.

This study will be based on previous work carried out by members of the research team and will shift the focus of previous studies from taxonomy—while taking into account a robust phylogenetic framework—to palaeoecology.
It will address aspects such as ontogeny and development, their impact on the ecological niches occupied by these vertebrates, and the morphofunctional and evolutionary implications.

Stays will be encouraged at foreign institutions with which the group has strong links, such as the universities of Aveiro (Portugal), the Museum für Naturkunde in Berlin (Germany), the University of Poitiers or Montpellier, or the Muséum national d'Histoire naturelle (Paris) in France, as well as the American Museum of Natural History in the United States.

ANNEX II.17

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-159284NB-I00	UNDERSTANDING SCENES IN COMPLEX ENVIRONMENTS: LIMITED DATA, INTERACTIVE SCENARIOS AND MULTI-AGENT SYSTEMS (LIMA)	PREP2024-003159

Principal investigator 1 of the project: Ana Cristina Murillo Arnal

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Principal investigator 2 of the project: Cristian Mahulea

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Scientific lines of the project in which the thesis would be framed

- Efficient scene understanding strategies. As with many other AI problems, some of the most significant challenges facing scene understanding algorithms are improving efficiency (to save time, energy and costs) and reducing the vast amounts of data that are typically required (especially the amount of annotated data). In addition to working on improving efficiency with regard to data and computational requirements, this line of research will focus on leveraging recent advances in multimodal foundation *models*. The results will serve as the basis for efficient *scene understanding* solutions in the rest of the project.

- Novel methods for managing dynamic and complex environments. This line will address all aspects associated with the consideration of dynamic environments, including the adequate modelling of the temporal evolution of such environments, the efficient processing of long videos to locate key events and capture long-term relationships, the recognition of complex interactions between different elements of the scene, and explainability. The result of this work will be a new set of tools and algorithms capable of performing complex reasoning at levels of semantic and temporal abstraction superior to those of the current state of the art.

- Robust and secure understanding of multi-agent scenarios. This line aims to develop robust and secure methods for understanding multi-agent scenarios, focusing on scalability, resilience, and secure communication. It will optimise trajectory planning and task allocation using advanced techniques such as Mixed Integer Linear Programming (MILP) and Petri net-based analysis. This line proposes to improve resilience through anomaly detection and robust optimisation, while ensuring secure data exchange through lightweight cryptographic protocols. In addition, federated learning will be explored to enable decentralised, privacy-preserving scene understanding. The results will support scalable and secure multi-agent frameworks for applications in industrial automation, surveillance and robotics.

ANNEX II.18

Project Reference	Project Title	Pre-doctoral grant reference for pre-doctoral grant application
PID2024-160228NB-I00	MUCH BEYOND STANDARD MODELS	PREP2024-002944

Principal investigator 1 of the project: Javier Redondo Martín

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Scientific lines of the project in which the thesis would be framed

- Axion Theory and Phenomenology (Cosmology, dark matter, astrophysics, experimental detection, HPC simulations)
- Particle Phenomenology Beyond the Standard Model (Flavour and Higgs physics, axion-like particles, machine learning)
- Lattice QCD (CKM and flavour universality anomalies, ϑ-vacuum, muon g–2)
- Beyond Special Relativity (Lorentz invariance violation, doubly special relativity, high-energy astroparticle physics)
- Beyond General Relativity and QFT (Quantum gravity, Casimir effects and ϑ-vacuum, quantum information, topological materials and axions, dark energy)
- Cosmology (Dark energy, extragalactic surveys (Euclid, SKAO), active galactic nuclei)

ANNEX II.19

Project reference:	Project title:	Pre-doctoral grant reference for application:
PID2024-156411NB-I00	LIVING IN THE FAST LANE: EXCEEDING THE SPEED LIMIT TO MONITOR NANOPARTICLES, CELLS AND MICROPLASTICS USING ICP-MS AND LA-ICP-MS (FASTEVENT)	PREP2024-002779

Principal investigator 1 of the project: Martín Resano Ezcaray

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Principal investigator 2 of the project: María Teresa Aramendía Marzo

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Scientific lines of the project in which the thesis would be framed

-Development of new analytical methods for the individual analysis of micro/nano structures (nanoparticles, cells, micro/nano plastics, etc.) using ICP-MS and laser ablation (LA) ICP-MS in single event mode

-Minimally invasive clinical elemental and isotopic analysis using micro dispensers and LA-ICP-MS/LIBS

ANNEX II.20

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-156641NB-I00	SELF-ASSEMBLY STRATEGIES FOR THE DESIGN OF ACTIVE SOFT SYSTEMS (SASTRES)	PREP2024-002804

Principal investigator 1 of the project: María Blanca Ros Latienda

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Principal investigator 2 of the project (if applicable): Raquel Giménez Soro

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Scientific lines of the project in which the thesis would be framed

Molecular self-assembly, a widespread phenomenon in biosystems, is a valuable tool for generating newly designed structures through supramolecular chemistry. In this sense, the assembly of structural units precisely designed to control intermolecular interactions and the non-covalent nature of these systems provide intrinsic properties such as self-healing and adaptation. Consequently, self-assembled materials are recognised as state-of-the-art materials for advanced (bio)technological applications.

In this context, and within the areas of Organic Chemistry, Supramolecular Chemistry and Nanotechnology, the scientific lines of the SASTRES project in which the doctoral thesis is framed aim to generate knowledge, fundamentally basic, on soft self-assembled systems sensitive to stimuli, essentially liquid crystals, gels and aggregates, and options for their processing.

The activities include the design, covalent and supramolecular chemical synthesis, spectroscopic and structural characterisation, and study of functional supramolecules using self-assembly strategies based on hydrogen bonding and columnar liquid crystals. This combination allows nanostructures to be obtained from simple molecules, with versatility in their processing and dynamic properties that respond to stimuli, mainly through luminescence.

ANNEX II.21

Project reference	Project Title	Pre-doctoral grant reference for application
PID2024-156735NA-I00	FREE CHOICE SCIENCE SPACES IN GAME-BASED INQUIRY CYCLES IN THE EARLY STAGES OF EDUCATION (EClesINJuego)	PREP2024-002298

Principal investigator 1 of the project: María José Sáez Bondía

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Scientific lines of the project in which the thesis would be framed

- Evaluation of game-based science learning environments in early education from the framework of Design-Based Research.
- Evidence-based design, application and evaluation of game-based teaching and learning sequences with teachers of Early Childhood Education and the first cycle of Primary Education.
- Evaluation of students' scientific learning in the sequences designed and applied for the generation of design principles for play-based inquiry cycles using freely chosen Science Spaces.
- Teachers' perceptions and actions regarding games for teaching and learning science in early education.

ANNEX II.22

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-156422OB-C31	GENERATING AND CHARACTERISING VARIETIES FOR MORE RESILIENT FORESTS	PREP2024-002395

Principal investigator 1 of the project: Ester Sales Clemente

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Principal investigator 2 of the project: Isabel Arrillaga Mateos

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Scientific lines of the project in which the thesis would be framed

The project proposes using biotechnological tools based on somatic embryogenesis to obtain and validate improved plant material from maritime pine (*Pinus pinaster),* holm oak (*Quercus ilex)* and cork oak (*Q. suber).* This will increase knowledge about the adaptation of these species to abiotic and biotic stresses. The lines of research that would form the basis of the thesis are:

1.- Characterisation (vigour, tolerance to biotic stress, terpene and phenol content, wood quality) of maritime pine plant material derived from heat *priming* trials generated in previous projects.

2.- Obtaining somatic maritime pine plants from embryogenic masses elicited with phytopathogenic fungal extracts. Controlled in vitro inoculation trials with the elicited materials. Analysis of gene expression and secondary metabolites.

3.- Development of new micropropagation methodologies for holm oak, cork oak and maritime pine.

ANNEX II.23

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-160339OB-I00	ENGINEERING OF NANOPARTICLES IN CELLS BY MEANS OF FLOW PROCESSES: A CIRCULAR APPROACH TO BIORTOGONAL CATALYSIS AND THERAPEUTIC APPLICATIONS	PREP2024-003067

Principal investigator 1 of the project: Víctor Sebastián Cabeza

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Scientific lines of the project in which the thesis would be framed

-Design of therapeutic vectors.
-Development of microfluidic systems for the controlled treatment of cells and extracellular vesicles.
-Activation of prodrugs through bio-orthogonal catalysis reactions.
-Nanotechnology applied to biomedicine
-Characterisation of nanomaterials, cells and extracellular vesicles. Evaluation of therapeutic capacity in 2D and 3D models.

ANNEX II.24

Project reference	Project Title	Pre-doctoral grant reference for application
PID2024-159417NB-I00	RELIGIOUS NETWORKS AND DISCOURSES, CONVENTUAL SOCIABILITY AND THE PROMOTION OF HOLINESS AND WORSHIP IN THE HISPANIC WORLD OF THE MODERN AGE	PREP2024-002710

Principal investigator 1 of the project: Eliseo Serrano Martín

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Principal investigator 2 of the project: Ana Morte Acín

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Scientific lines of the project in which the thesis would be framed

The end of the Council of Trent (1563) marked the beginning of the indoctrination of the population by the social and religious elites through various means of propaganda: catechisms, sermons, art...as well as other more repressive and extraordinary means such as censorship, the elimination of dissident minorities and control of the population through public confession and inquisitorial tribunals, as highlighted by A. Prosperi (1996). The Church and the civil powers collaborated in the processes of social discipline, this being one of the fundamental pillars of the nascent modern state. There is abundant literature on the phenomenon (Palomo, 2005; Niccoli, 2012; Prosperi, 2008; Pitassi, 2010). There is also literature on the ruptures that developed in opposition to this standardisation (Schwartz, 2010; Dadson, 2014; Pastore, 2003; García Cárcel and Serrano, 2021). Most recent studies have shown that civil and religious authorities took advantage of the territorial organisation of the Church, united in dogma, administration and internal networks, for the moral and political homogenisation of the population. This project aims to emphasise the study of this process through three key aspects: the establishment of social networks among the clergy by analysing their discourses, conventual sociability and the promotion of holiness. All this in a specific context: Aragon in the Modern Age, without losing sight of comparisons with other similar contexts in the Hispanic world: the Hispanic kingdoms, Naples, Central Europe, America... This starting point allows us to study the phenomena of confessionalisation, social disciplining and the political construction of the modern state through novel methodologies and paradigms, such as network analysis, technological implementation and gender studies. We must also bear in mind that there are reasons to believe that religious discourses within each confessional sphere were also influenced, intentionally or not, by external agents. If, as it seems, historiographical studies on globalisation are increasingly taken into account (especially considering that the modern centuries allowed civilisations to get to know each other and forge closer ties than ever before in history, mainly through the interests of commercial capitalism and the
establishment of colonial empires with universal aspirations) (Barker, 2018, Darke,

2024), we have even more reason to consider undertaking that same task here. Textual criticism, biographical study, and detailed and comparative analysis of different confessional patterns beyond our immediate geographical environment are tasks that may offer a novel and alternative perspective within the field of Catholic intellectualism and religious and political ideology at the local level.

ANNEX II.25

Project reference	Project title	Reference for pre-doctoral assistance for application
PID2024-157662OB-C21	CHARACTERISTICS AND IMPACTS OF DROUGHTS IN THE MEDITERRANEAN SLOPE OF THE PENINSULA	PREP2024-002991

Principal investigator 1 of the project: Roberto Serrano Notivoli

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Principal investigator 2 of the project: Martín de Luis Arrillaga

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Scientific lines of the project in which the thesis would be framed

The main objective of the doctoral work will be to analyse the historical evolution of droughts in the Mediterranean region of the Iberian Peninsula, combining climate databases and dendrochronological records to assess their impact on water resources and water management at different temporal and spatial scales.

The selected candidate will employ a multidisciplinary methodology involving the management and integration of high-resolution tree growth series, specifically for Aleppo pine (*P. halepensis*). These series will be calibrated and validated with instrumental data and climate modelling techniques for the reconstruction of extreme hydrological events. The project seeks to contextualise these water extremes within the framework of current climate change, generating crucial knowledge for adaptive spatial planning and improving regional water security.

The thesis will be developed in the Department of Geography and Land Management at the University of Zaragoza (UZ), within the doctoral programme in "Land Management and the Environment".

ANNEX II.26

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-159699NB-I00	TOWARDS A SPECIAL RIGHT TO PUBLIC EMPLOYMENT: LEGAL REGULATION AND CONVENTIONAL EXPERIENCE IN THE FACE OF NEW SCENARIOS FOR THE PROVISION OF SERVICES (DEmPLa)	PREP2024-003343

Principal investigator 1 of the project: Ángel Luis de Val Tena

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Scientific lines of the project in which the thesis would be framed

- The legal framework—law and collective bargaining—for the provision of services by staff employed by a public administration.

- Collective bargaining in the public administration sector and the determination of the applicable collective agreement.

- The status of the public administration as an employer, with all its implications, including cases of subrogation in the provision of services.

- The system for accessing public sector employment, as well as the common and specific forms of employment contract for staff.

- The organisation of the professional activity of public administration staff and, in particular, the application of internal flexibility measures.

- The working conditions of public administration staff (working hours, remuneration, occupational risk prevention, among others).

- Teleworking and other forms and instruments for providing services with the development of digital administration and artificial intelligence.

- Cases of suspension of the employment contract and grounds for termination, as well as the disciplinary regime in the Public Administration

- Measures to reconcile personal, family and working life applicable to staff employed by the public administration.

- The collective rights of workers in the Public Administration.

- Equality plans in public administrations.

- Regulatory models for the provision of services in public administrations in comparative law.

ANNEX II.27

Project reference	Project title	Pre-doctoral grant reference for application
PID2024-157480OB-I00	GENOMICS AND MICROBIOMICS OF RESILIENCE IN IBERIAN PIGS	PREP2024-002474

Principal investigator 1 of the project: Luis Varona Aguado

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Scientific lines of the project in which the thesis would be framed

The overall objective of the thesis is to develop a low-cost protocol for the genetic and genomic evaluation of resilience in Iberian pigs, as well as to identify genomic and microbiome biomarkers that can be routinely used in the development of genetic improvement programmes for Iberian pigs.

This general objective can be broken down into the following specific objectives:

- Estimate the quantitative genetic parameters of resilience to immune and environmental stress.
- Quantify the influence of microbiome composition on resilience to environmental stress.
- Evaluate the efficiency of resilience indicators obtained from longitudinal records of feed intake and body weight, and compare them with biological measures of stress (TNF-α, C-reactive protein and cortisol).
- To evaluate the influence of stress on microbiome composition.
- Identify genomic and microbiome biomarkers associated with resilience.

ANNEX II.28

Project Reference	Project Title	Pre-doctoral grant reference for application
PID2024-157236OB-I00	X-RAY TOMOGRAPHY AND ADVANCED METROLOGY FOR ADDITIVE MANUFACTURING OF COMPLEX COMPONENTS IN TERMS OF THEIR GEOMETRY, STRUCTURE AND MATERIALS	PREP2024-003022

Principal investigator 1 of the project: José Antonio Yagüe Fabra

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Principal investigator 2 of the project: José Antonio Albajez García

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Scientific lines of the project in which the thesis would be framed

- *Dimensional metrology of lattice structures based on Triply Periodic Minimal Surfaces (TPMS): These types of structures can now be produced using additive manufacturing (AM), but ensuring their dimensional and geometric accuracy is a major challenge due to the complexity of their internal surfaces.*
- *X-ray computed tomography (X-CT): this is the most suitable technology for the non-destructive analysis of these complex structures, both in terms of their geometry and their internal defects, but its effectiveness depends on the careful selection of the machine's operating parameters (voltage, current, exposure time).*
- *Machine learning: the aim is to develop an assistant for the X-CT machine configuration process (predictive model) that takes into account the choice of tomography equipment configuration parameters in the measurement result.*