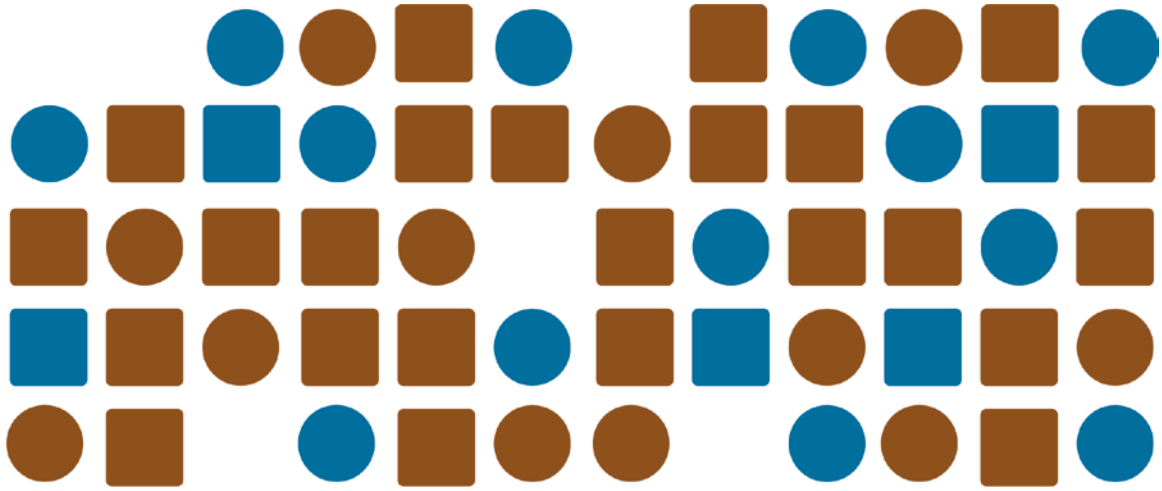


IOC

Institute of Industrial and Control Engineering

Activity Report of the Academic course 2024-2025

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Institute of Industrial and Control Engineering

Table of contents

1. Organisational structure and governing bodies

Management

Director	ROBERT GRIÑÓ CUBERO until 25/11/24 BRUNO DOMENECH from 26/11/24
Assistant director	ANTONIN SEBASTIEN PONSICH until 12/03/25 JAN ROSELL GRATACÒS from 13/03/25
Secretary	BRUNO DOMÈNECH LEGA until 02/12/24 VÍCTOR REPECHO DEL CORRAL from 03/12/24
Technical and Management Support Area - UTGAEIB	M. LOURDES DURANY VIDAL

The Board

Director	ROBERT GRIÑÓ CUBERO until 25/11/24 BRUNO DOMENECH from 26/11/24
Assistant director	ANTONIN SEBASTIEN PONSICH until 12/03/25 JAN ROSELL GRATACÒS from 13/03/25
Secretary	BRUNO DOMÈNECH LEGA until 02/12/24 VÍCTOR REPECHO DEL CORRAL from 03/12/24
Representative of the **Control** division	OLM MIRAS JOSEP M. until 10/07/25 ROBERT GRIÑÓ CUBERO from 11/07/25
Representative of the **Design and Optimisation of Processes and Services (DOPS)** division	LAIA FERRER MARTÍ
Representative of the **Robotics** division	RAÚL SUÁREZ FEIJÓO
Technical and Management Support Area - UTGAEIB	M. LOURDES DURANY VIDAL
Representative of teaching and research staff who hold a PhD	JAN ROSELL GRATACÒS
Representative of administrative and service staff	LEOPOLD PALOMO AVELLANEDA

The Council

Alfaro Pozo, Rocío	
Arias Pujol, Antoni	
Batlle Arnau, Carles	
Bautista Valhondo, Joaquin	
Biel Solé, Domingo	
Calleja Sanz, Gema	
Casanovas Rubio, Mar	
Domenech Lega, Bruno	Secretary until 02/12/24 Director from 26/11/24
Dòria Cerezo, Arnau	
Durany Vidal, Ma Lourdes	Technical and Management Support Area UTGAEIB
Ferrer Martí, Laia	Representative of the Design and Optimisation of Processes and Services (DOPS) division
Fossas Colet, Enric	
García Villoria, Alberto	
Griñó Cubero, Robert	Director until 25/11/24 Representative of the Control division from 11/07/25
Hatami, Sara	
Juanpera Gallel, Marc	
Lusa Garcia, Amaia	
Mas Casals, Orestes	
Mateo Doll, Manel	
Miró Valero, Enric	
Olivella Nadal, Jordi	
Olm Miras, Josep Maria	Representative of the Control division until 10/07/25
Palomo Avellaneda, Leopold	Representative of administrative and service staff
Pastor Moreno, Rafael	
Peña Carrera, Marta	
Peña Pitarch, Esteban	

The Council

Ponsich, Antonin Sebastien	Assistant director until 12/03/25
Repecho del Corral, Víctor	Secretary from 03/12/24
Roig Fernández, Vicenç	
Rosell Gratacòs, Jan	Assistant director from 13/03/25
Suárez Feijóo, Raúl	Representative of the Robotics division
Zaplana Agut, Isiah	

2. Staff

GLOSSARY

DIVISIONS/SERVICE	CTL	Division of Automatic Control
	DOPS	Division Design and Optimisation of Processes and Services
	ROB	Division of Robotics
CATEGORY	AG/TU	Associate professor
	LT	Assistant professor
	BR	Research grantholder
	CU	Professor
	DI	Research supervisor
	PAS LAB	Technical staff
	PSR	Research staff

NAME		DIVISIONS/ SERVICE	CATEGORIES
Acosta Montilla	Alejandro	ROB	PSR
Alfaro Pozo	Rocío	ROB	TU
Arias Pujol	Antoni	CTL	TU
Batlle Arnau	Carles	CTL	TU
Bautista Valhondo	Joaquin	ROB	CU
Biel Solé	Domingo	CTL	TU
Boira Pujol	Pau	CTL	PSR
Calleja Sanz	Gema	DOPS	AG
Casanovas Rubio	Mar	DOPS	AG

NAME		DIVISIONS/ SERVICE	CATEGORIES
Domènech Lega	Bruno	DOPS	AG
Dòria Cerezo	Arnau	CTL	AG
Ferrer Martí	Laia	DOPS	CU
Fossas Colet	Enric	CTL	CU
García Villoria	Alberto	DOPS	AG
Gil Figuerola	Pol	DOPS	BR
Griñó Cubero	Robert	CTL	TU
Hatami	Sara	DOPS	LT
Juanpera Gallel	Marc	DOPS	LT
Khamis	Mahmoud	CTL	BR
Luciano	Ludovica	CTL	BR
Lusa García	Amaia	DOPS	CU
Llorca Quitin	Nathalie	DOPS	PSR
Mas Casals	Orestes	ROB	TU
Mateo Doll	Manuel	DOPS	TU
Miró Valero	Enric	SSR	PAS LAB.
Muggi Cisneros	Andres W.	DOPS	BR
Olivella Nadal	Jordi	DOPS	TU
Olm Miras	Josep M.	CTL	AG
Palomo Avellaneda	Leopold	SSR	PAS LAB.

NAME		DIVISIONS/ SERVICE	CATEGORIES
Pastor Moreno	Rafael	DOPS	CU
Peña	Marta	DOPS	AG
Peña Pitarch	Esteban	ROB	TU
Ponsich	Antonin Sebastien	DOPS	LT
Pujol Closa	Marina	ROB	PSR
Rahimi	Leyla	CTL	BR
Ramon Canyameres	Pol	ROB	PSR
Raza	Muhammad Ilyas	ROB	BR
Repecho Del Corral	Victor	CTL	LT
Rosell Gratacòs	Jan	ROB	TU
Ruiz Celada	Oriol	ROB	BR
Sheikhsamad	Mohamad	ROB	BR
Suárez Feijóo	Raúl	ROB	DI
Urbaniak	Dominik	ROB	BR
Zaplana Agut	Isiah	ROB	LT

Other PhD Students

NAME		DIVISIONS/ SERVICE
Aguilar Gamarra	Harry Nick	DOPS
Alaeddin	Mojtaba	CTL
Codina Torras	Eloi	DOPS
Martrat Martí	Carlos Javier	CTL
Romero Sepúlveda	Arnau	ROB
Salvadó Benasco	Marc	ROB
Shirzadi Maryan	Morad	ROB

Visiting Staff

NAME	DIVISIONS	UNIVERSITY
Pietro De Lellis	DOPS	Università degli Studi di Napoli Federico II

Incoming Students

NAME	DIVISIONS	UNIVERSITY
Elettra Favazza	DOPS	Universitat Autonoma de Barcelona
Emanuele Musico	CTL	University of Naples Federico
Fabio Romagnuolo	CTL	University of Naples Federico II
Ludovica Ruggiero	CTL	University of Naples Federico II
Marco Laviola	CTL	Politecnico di Torino
Marina Alexandra Pérez	ROB	Escuela Superior Politécnica del litoral
Mario Estrada	ROB	Escuela Superior Politécnica del litoral
Roberto Aratri	CTL	Politecnico di Bari
Sergio De Bellis	CTL	Politecnico di Bari

3. Divisions

Research at the IOC is conducted through three divisions:

Division of Automatic Control

The main projects in this division are set in the following thematic areas: Control Theory, Energy Systems and Automotive Applications.

Head: JOSEP M. OLM MIRAS until 10/07/25 - ROBERT GRIÑÓ CUBERO from 11/07/25

Research fields:

- Advanced linear controllers (Resonant and repetitive control).
- Nonlinear control techniques (Passivity-based control, Adaptive control, Sliding mode control).
- Complex dynamical networks.
- Modelling and control of electronic power systems (generation and conversion).
- Control algorithms for an overall improvement of the vehicle performance.
- Autonomous and cooperative driving applications.

Division of Design and Optimisation of Processes and Services

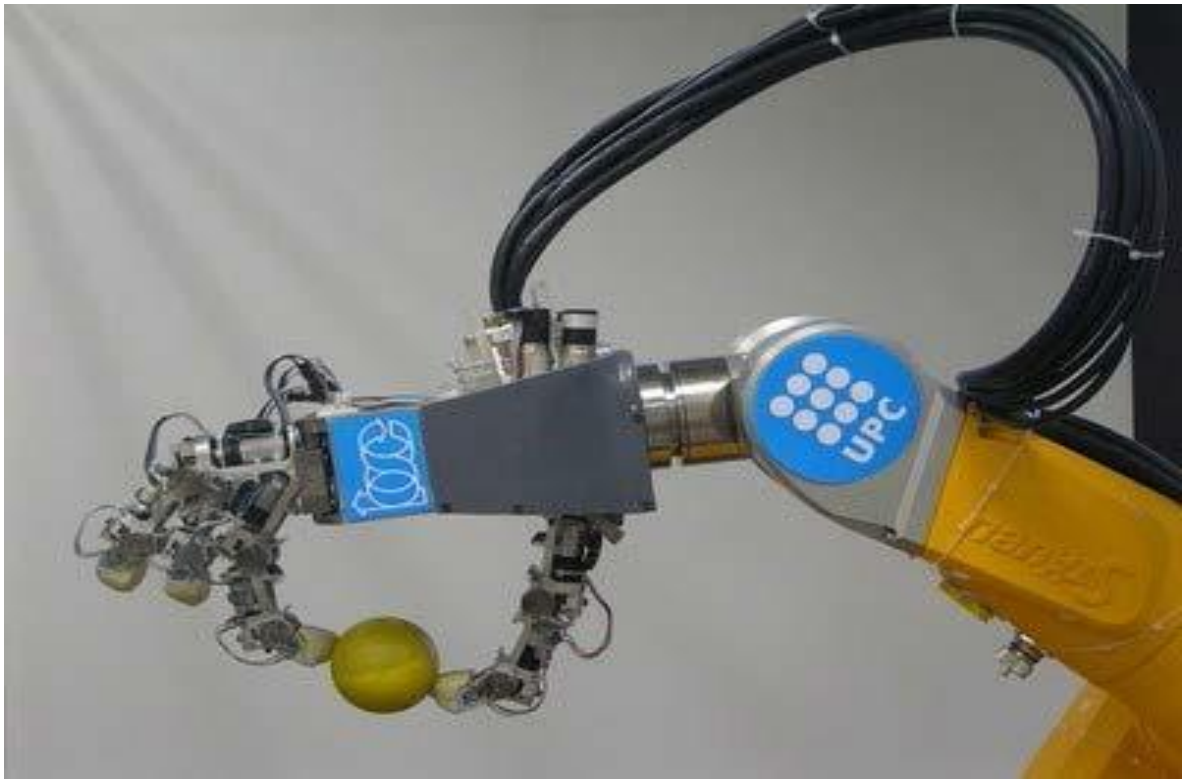
The Division of Design and Optimisation of Processes and Services covers the design and management of the supply chain, namely production and logistic Systems to generate goods and services, as well as the necessary techniques for solving efficiently its derived problems.

Head: LAIA FERRER MARTI

The division of Design and Optimisation of Processes and Services specializes in developing optimization models and decision-making support tools for supply chain design (production, distribution, recovery and remanufacturing or recycling). The aim of the group is to contribute to the improvement of the efficiency and sustainability, economic and environmental, of the organizations. The group's research has a highly applied approach to ensure that the results are directly applicable and easily transferable to productive and service organizations.

Fields of activity
Industry 4.0 in the field of the supply chain
Operations management
Urban distribution and mobility
Energy planning with renewable energies
Healthcare logistics
Circular and social economy

Division of Robotics



The Division of Robotics of the IOC deals with basic and applied research on different aspects of robotics, either considering the robot as a single machine or integrated with other elements and devices within a robotized system. The research extends to different application fields in both the industrial and service areas.

Head: RAÚL SUÁREZ FEIJÓO

Main fields of activity

- Task and motion planning
- Grasping and dexterous manipulation
- Mobile manipulators
- Robot co-workers
- Human-robot interaction
- Teleoperation and haptic systems
- Control and programming of robots
- Perception systems and sensor integration
- Computer vision
- Simulation of robotized systems
- Industrial applications of robotics
- Service robots

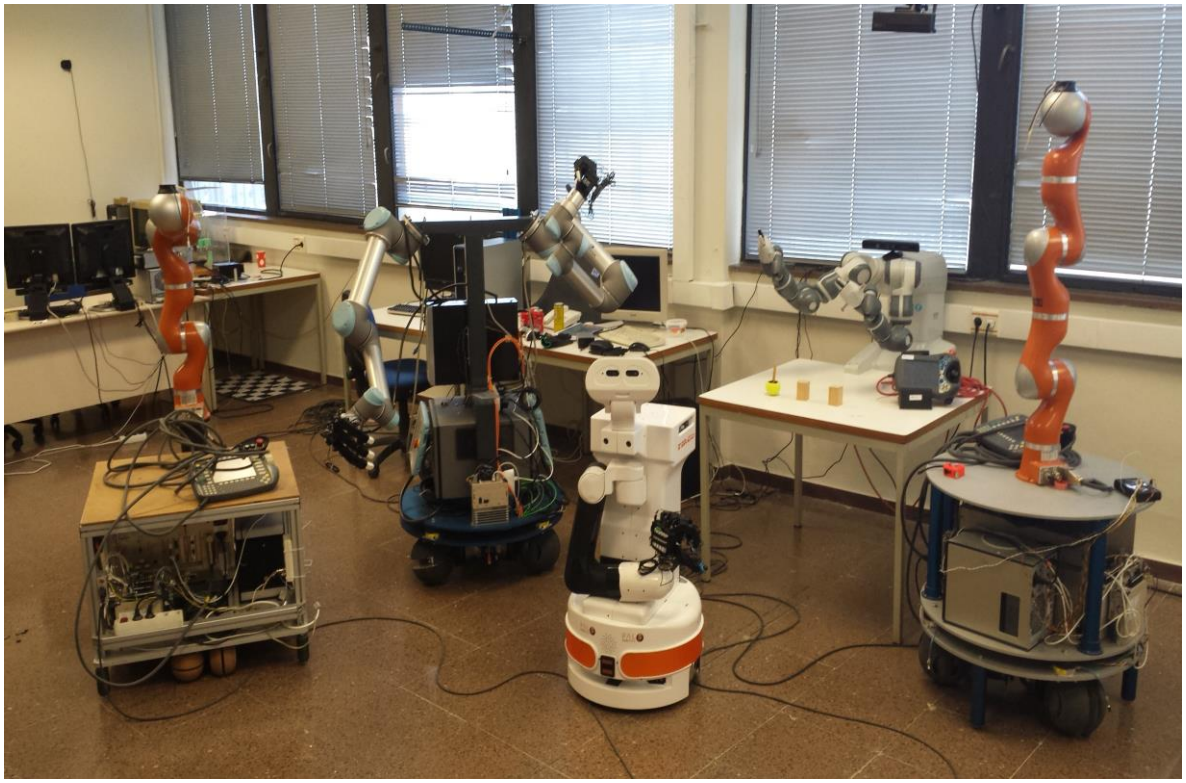
4. Facilities

The IOC is located on the 11th floor of building H of the Barcelona School of Industrial Engineering (ETSEIB).

The Institute has two robotics laboratories; a control and electronics laboratory; a logistics laboratory; a computer network equipped with servers, workstations, PCs; a WiFi network; a specialised library with around 6,000 books and numerous journals; a classroom that can hold 25 people; and a meeting room with videoconferences equipment, a digital blackboard and a projector with a capacity for 10 people.

Equipping research laboratories

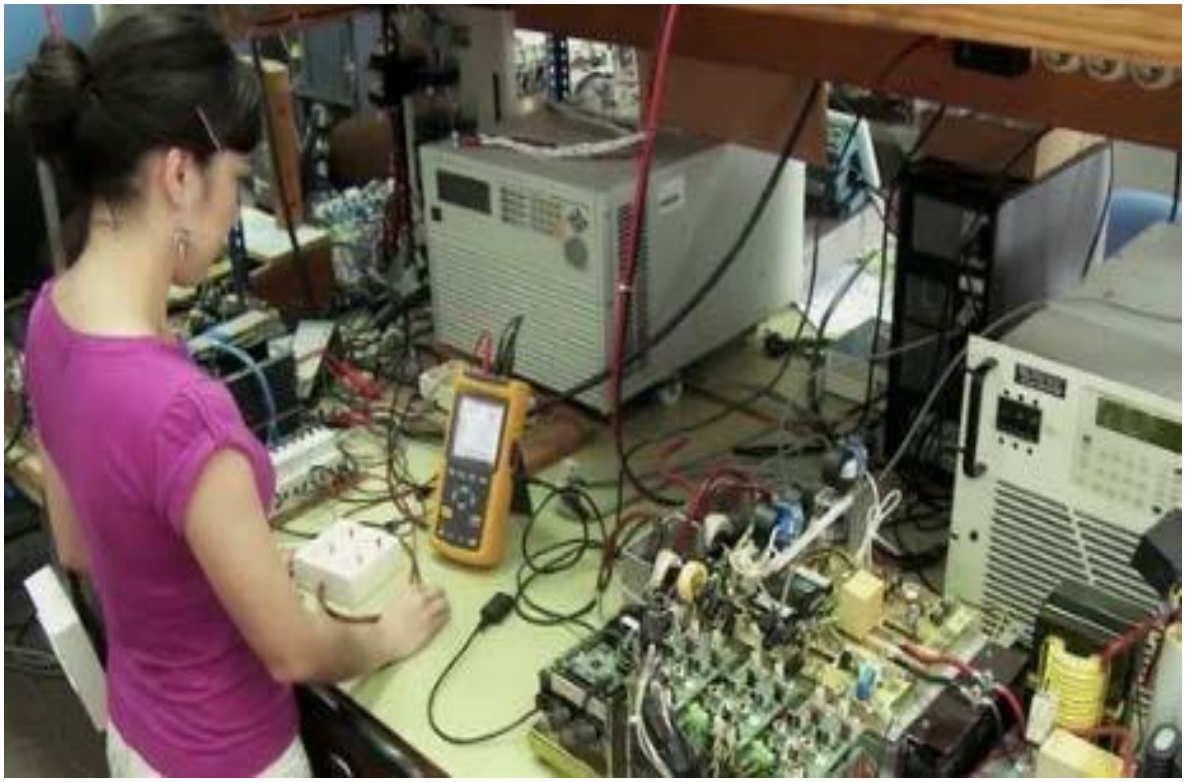
Robotics Laboratories



- 2 Stäubli TX90 robots, one is mounted on a motorized rail.
- 2 Kuka LWR robots with 7 axes, each one mounted on a mobile platform (BMM1 and BMM2).
- 1 Pal Robotics TIAGo equipped with two arms.
- 1 YuMi ABB robot.
- An omnidirectional mobile dual-arm robot (equipped with two Universal UR5 arms).

- Several grippers and robotic hands: Schunk SAH, Schunk SDH and 3 Allegro hands.
- Haptic devices: Phantom Omni, Phantom Premium 1.5/6DOF and Phantom Premium 1.5/6DOF High force.
- Sensory systems such as video cameras, trackers, force sensors, tactile sensors and 3D cameras.
- A 3D projector with the corresponding glasses.
- Several servers, PCs, monitors.
- 2 virtual reality glasses Oculus Rift.
- 1 Drone DJI Phantom 2 Vision+.
- 1 Drone Parrot AR.Drone 2.0.

Control and Electronics Laboratory



- Oscilloscopes.
- Signal analyzer and signal generators.
- Sources and power loads (e.g. ac and dc power sources, and ac and dc programmable loads).
- Measuring instrumentation (multimeters, differential probes, current probes).
- Emulators for microprocessors and digital signal processors.
- Computers.
- Hardware and software for the design and implementation of electronic circuits.
- Tools and equipment for the realization of small-scale mechanical assemblies.
- Thermographic camera.

DOPS Computing Cluster

The DOPS Computing Cluster is a robust computational infrastructure comprising eleven interconnected units managed by SLURM (Simple Linux Utility for Resource Management), used in High Performance Computers. SLURM efficiently allocates resources and schedules job executions, ensuring optimal performance and equitable resource distribution across the center's units.

➢ **Equipment Configuration:**

- Four nodes with 4GB of RAM each.
- Five nodes with 16GB of RAM each.
- One node with 40 cores (Intel Xeon E5-2630 v4) and 64GB of RAM.
- One node with 128 cores (AMD EPYC 7543) and 256GB of RAM.

➢ **Additional Features:**

- Parallel Processing with OpenMP: Users can harness OpenMP for parallel processing, leveraging multicore architectures for efficient computation.
- Optimization with Docplex: The center supports Docplex, facilitating the resolution of complex optimization problems through mathematical programming.
- Python Virtual Environments (venv): Users can create and manage virtual environments within the Python environment (venv), ensuring isolation, compatibility and reproducibility for specific projects.
- Scheduled job Execution: SLURM enables users to schedule job executions at predetermined times, streamlining workflow processes and optimizing resource utilization.
- Customizable resources allocation: Users can specify the maximum RAM, CPU's size for their jobs, preventing resource contention and maximizing efficiency.
- Reproducibility and metrics: Users can run a program in a controlled environment to accurately measure its performance and execution time in a consistent manner. This helps avoid interferences and workload fluctuations, ensuring reliable measurements of the program under standardized CPU and memory conditions.

5. University masters

Master’s Degree in Automatic Control and Robotics

The Master's degree in Automatic Control and Robotics is an official degree adapted to European Higher Education Area (EHEA) offered by the Technical University of Catalonia (UPC) since the academic course 2006-07. The Masters is promoted by the Department of Systems Engineering, Automation and Industrial Informatics (ESAII) and the Institute for Systems and Control Engineering (IOC). It is a research oriented master in the area of Automatic Control and Robotics.

The Institute of Industrial and Control Engineering (IOC) was set up for the purposes of conducting research and training researchers to a high level of specialisation. It is actively involved in teaching master and doctoral degrees.

6. Master theses

Author: **Endara Velez, Ana**. **Complex Sliding Control for a Permanent-Magnet Synchronous Machine**. 13/02/2025. Excellent. Supervisors: Biel, D.; Repecho, V.. Universitat Politècnica de Catalunya.

Author: **Rovira I rubau, Adrià**. **Optimització d'Espais Híbrids: Disseny d'un Dashboard per a la Gestió Sostenible en Entorns Corporatius**. 18/07/2025. Very Good. Supervisors: Calleja, G.. Universitat Politècnica de Catalunya.

Author: **Escribano Garcia, Victor**. **Development of Synthetic Visual Datasets to Enhance Weed and Crop Perception in Agricultural Robots**. 11/07/2025. Very Good. Supervisors: Rosell, J.. Universitat Politècnica de Catalunya.

Author: **Franco Martí, Pau**. **Desenvolupament d'algorismes per a la seqüenciació d'ordres de fabricació.**. 15/07/2025. Excellent. Supervisors: Domenech, B.. Universitat Politècnica de Catalunya.

Author: **Micolau, M.**. **Development of a Second-Life Battery Pack for Decentralized Digital Twin-Driven Decision-Making Systems**. 14/07/2025. Excellent. Supervisors: Biel, D.; Heredero-Peris, D.. Universitat Politècnica de Catalunya.

Author: **García Martín, Álvaro**. **Estudio de un problema de secuenciación y temporización de máquinas utilizando procedimientos de resolución heurísticos**. 14/07/2025. A with honours. Supervisors: Domenech, B.. Universitat Politècnica de Catalunya.

Author: **Garcia Andreischeva, Nicolay Sergeevich**. **Design and simulation of a resonant wide gain isolated bidirectional DC/DC converter (CLLLC)**. 14/07/2025. Very Good. Supervisors: Biel, D.; Repecho, V.. Universitat Politècnica de Catalunya.

Author: **Alvarado Miranda, Marianela Mitzel**. **Formalización de los procesos operativos en logística, con un enfoque de asignación flexible de recursos**. 14/07/2025. Excellent. Supervisors: Mateo, M.. Universitat Politècnica de Catalunya.

Author: **Morató López, Marc**. **Design and implementation of the control loop for a H-Bridge converter cell based on a lithium ion battery**. 14/07/2025. Very Good. Supervisors: Biel, D.. Universitat Politècnica de Catalunya.

Author: **Veciana Pérez, Eric**. **Assignació d'activitats extraescolars entre un conjunt d'escoles mitjançant procediments heurístics**. 03/02/2025. Very Good. Supervisors: Mateo, M.. Universitat Politècnica de Catalunya.

Author: **López Morejón, Xavier**. **Programación y secuenciación de órdenes de fabricación en una máquina, considerando los costes energéticos**. 31/01/2025. Excellent. Supervisors: Juanpera, M.. Universitat Politècnica de Catalunya.

Author: **Vendrell Fernández, Laia**. **Disseny i programació d'un nou Mòdul Professional sobre el vehicle elèctric, al Cicle Formatiu de Grau Superior d'Automoció**. 17/10/2024. A with honours. Supervisors: Peña, M.. Universitat Politècnica de Catalunya.

Author: **Kolarkar, Aditya Nitin**. **"Building Climate-Resilient Universities: Application of MIVES to Evaluate Technologies for Climate Change Adaptation and Mitigation"**. 08/10/2024. Excellent. Supervisors: Casanovas-Rubio, M.; Calleja, G.. Universitat Politècnica de Catalunya.

Author: **Hernández I sardà, David**. **Anàlisi, caracterització i optimització d'un procés productiu mitjançant l'automatització del mateix**. 04/10/2024. Very Good. Supervisors: Rosell, J.. Universitat Politècnica de Catalunya.

Author: **Hernández I sardà, David**. **Anàlisi, caracterització i optimització d'un procés productiu mitjançant l'automatització del mateix**. 04/10/2024. Very Good. Supervisors: Rosell, J.. Universitat Politècnica de Catalunya.

Author: **Losada Cavestany, Beatriz**. **Avaluació i optimització dels plans municipals d'adaptació climàtica: el cas de la participació de la UPC.**. 03/10/2024. Excellent. Supervisors: Calleja, G.; Casanovas-Rubio, M.. Universitat Politècnica de Catalunya.

Author: **Ramon, P.**. **Motion Coordination of a Mobile Anthropomorphic Dual-Arm Robot for manipulation actions using visual-guidance**. 01/10/2024. Excellent. Supervisors: Rosell, J.. Universitat Politècnica de Catalunya.

7. Doctoral degrees

Doctoral programme in Automatic Control, Robotics and Computer Vision (ARV)

The Doctoral programme in Automatic Control, Robotics and Computer Vision (ARV) emerged in 2006 from the fusion of the Doctoral programme in Advanced Automation and Robotics of the Institute of Industrial and Control Engineering (IOC) and of the Doctoral programme in Control, Vision and Robotics of the Automatic Control Department (ESAII), both with Quality Mention of the Spanish Ministry of Education (MEC). The fusion was fruit of an increasing thematic affinity and convergence between both programmes, and was carried out taking advantage of the opportunity to adapt the programme to the new syllabus of the Official Postgraduate Programmes in the framework of the European Higher Education Area.

The ARV Doctoral programme achieved from the beginning the Quality Mention, from the academic year 2007-2008 until 2010-2011. Then this award was replaced by the Excellence Mention by the Spanish Ministery of Education, with code MEE2011-0453. This mention was awarded from the academic years 2011-2012 until 2013-2014, and the programme ARV always obtained it.

The units responsible for the program are:

- Automatic Control Department (ESAII)
- Institute of Industrial and Control Engineering (IOC)

Academic Commission for the doctoral degree in Automatic Control, Robotics and Computer Vision (ARV)

- Dr. Vicenç Puig Cayuela (Coordinator PhD ARV)
- Dr. Arnau Dòria
- Dra. Anaís Garrell
- Dr. Manel Frigola
- Dr. Robert Griñó
- Dr. Josep M. Olm
- Dr. Jan Rosell
- Dr. Manel Velasco

Doctoral data 2024-2025

A. Program Coordinator	**VICENÇ PUIG CAYUELA**
B. Number of students	**123** (2024/2025)
Thesis presented during 2024/2025:	

Date	06/11/2024
Title	Power control and voltage quality enhancement on inverter-based AC microgrids
Author	DUARTE MEJÍA, JOSUÉ NEFTALÍ
Thesis Director Thesis Codirector	VELASCO GARCIA, MANUEL MARTI COLOM, PAU
Qualification	Excel.lent Cum Laude

Date	08/11/2024
Title	CeCi: Design, Development and Validation of an Affordable Consumer Service Robot as a Social Robot
Author	FLORES VÁZQUEZ, CARLOS ALBERTO
Thesis Director	ANGULO BAHON, CECILIO
Qualification	Excel.lent

Date	05/12/2024
Title	Human motion and intention prediction/detection for human-robot collaboration
Author	LAPLAZA GALINDO, JAVIER
Thesis Director Thesis Codirector	SANFELIU CORTES, ALBERTO MORENO NOGUER, FRANCESC D'ASSIS
Qualification	Excel.lent Cum Laude

Date	16/12/2024
Title	Contribució a la identificació de models LTI intervalars en el domini de la freqüència
Author	MASIP ÁLVAREZ, ALBERT
Thesis Director Thesis Codirector	PUIG CAYUELA, VICENÇ QUEVEDO CASÍN, JOSÉBA-JOKIN
Qualification	Excel.lent

Date	18/12/2024
Title	Foundations of ontology-based explainable robots
Author	OLIVARES ALARCOS, ALBERTO
Thesis Director Thesis Codirector	ALENYÀ RIBAS, GUILLEM FOIX SALMERON, SERGIO
Qualification	Excel.lent Cum Laude

Date	28/01/2025
Title	Contributions to the real-time leak management of water systems
Author	ROMERO BEN, LUIS
Thesis Director Thesis Codirector	PUIG CAYUELA, VICENÇ CEMBRANO GENNARI, M. GABRIELA ELENA
Qualification	Excel.lent Cum Laude

Date	28/01/2025
Title	Learning control from data: Convergence guarantees and applications to robotic cloth manipulation
Author	CALDARELLI, EDOARDO
Thesis Director Thesis Codirector	TORRAS GENIS, CARMEN COLOMÉ FIGUERAS, ADRIÀ
Qualification	Excel.lent

Date	14/02/2025
Title	Artificial Intelligence to Improve Plastic Molding Processes
Author	LOPES E SILVA, BRUNO MIGUEL
Thesis Director Thesis Codirector	ALENYÀ RIBAS, GUILLEM CHARRUA DE SOUSA, JOÃO MIGUEL
Qualification	Excel.lent

Date	27/02/2025
Title	Robot Navigation Issues and Human-Robot Collaborative Search using Deep Learning Methods
Author	GIL VIYUELA, OSCAR
Thesis Director Thesis Codirector	SANFELIU CORTES, ALBERTO
Qualification	Excel.lent

Date	02/04/2025
Title	End-to-end learning for wind turbine blades: from imagery data to defect repair recommendations
Author	PÉREZ I GONZALO, RAÜL
Thesis Director	AGUDO MARTÍNEZ, ANTONIO
Qualification	Excel.lent Cum Laude

Date	22/04/2025
Title	Automatic control for unmanned ground vehicles
Author	YANG, RUICONG
Thesis Director Thesis Codirector	PUIG CAYUELA, VICENÇ BERNAT MASÓ, ERNEST
Qualification	Excel.lent

Date	25/04/2025
Title	State estimation, diagnosis and control using set-based approaches for LPV systems
Author	ZHANG, SHUANG
Thesis Director Thesis Codirector	PUIG CAYUELA, VICENÇ IFQIR, SARA
Qualification	Excel.lent Cum Laude

Date	07/05/2025
Title	Monitoring and optimal operation of vanadium redox flow batteries
Author	PULESTON, THOMAS PAUL
Thesis Director Thesis Codirector	SERRA PRAT, MARIA COSTA CASTELLO, RAMON
Qualification	Excel.lent Cum Laude

Date	19/05/2025
Title	Bio-inspired event-driven intelligence for motion estimation
Author	TIAN, YI
Thesis Director	ANDRADE CETTO, JUAN
Qualification	Notable

Date	23/05/2025
Title	Linking human poses with natural language
Author	DELMAS, GINGER DIANA
Thesis Director Thesis Codirector Tutor	MORENO NOGUER, FRANCESC D'ASSIS WEINZAEPFEL, PHILIPPE SÁNCHEZ RIERA, JORDI
Qualification	Excel.lent Cum Laude

Date	19/06/2025
Title	Fault diagnosis and prognosis approach using data-driven structurally generated residuals
Author	FANG, XIN
Thesis Director Thesis Codirector	PUIG CAYUELA, VICENÇ BLESA IZQUIERDO, JOAQUIN
Qualification	Excel.lent

Date	15/07/2025
Title	Understanding human intention for human-robot interaction
Author	DOMíNGUEZ VIDAL, JOSé ENRIQUE
Thesis Director	SANFELIU CORTES, ALBERTO
Qualification	Excel.lent Cum Laude

Date	21/07/2025
Title	Functional safety for highly automated vehicles
Author	CONEJO BARCELÓ, CARLOS
Thesis Director Thesis Codirector	PUIG CAYUELA, VICENÇ MORCEGO SEIX, BERNARDO
Qualification	Excel.lent Cum Laude

Doctoral programme Supply chain and operations management (SCOM)

The aim of the doctoral program SCOM (Supply Chain & Operations Management) is to promote and develop research into the supply chain and thus contribute to improve the economic and environmental efficiency of all kind of organizations.
Currently, the concept of supply chain, which includes and exceeds operations management and logistics, articulates the research on supply, production, distribution and recovery. Although, strictly speaking, the concept of supply chain management includes operations management, the fact of joining them in the name of the PhD program indicates which is the aspect of the SC management in which the program focuses most.
SCOM begins in 2016 with the participation of the academic staff of the Department of Management (OE) and the Institute of Industrial Engineering of Control (IOC) has recognized extensive teaching, research and thesis experience in the monitoring program. Moreover, the participation of these personnel in conferences, research projects and publications in high impact journals shows their own experience of research on the item of SCOM.
Academic Commission for the doctoral degree:

- Dr. Manel Mateo Doll (Coordinator PhD SCOM)
- Dra. Amaia Lusa Garcia
- Dr. Bruno Domenech Lega
- Dra. Imma Ribas Vila
- Dra. Laia Ferrer Marti
- Dr. Rafael Pastor Moreno

Doctoral data 2024-2025

A. Program Coordinator	**MANEL MATEO DOLL**
B. Number of students	**13** (2024/2025)
Thesis presented in 2023-24:	**0**

8. Projects and agreements

Public funding projects

Head researcher	CASANOVAS RUBIO, MAR
Title	Empowerment of low-income population for the self-construction of pavements by means of earthen paving: an experience in the Vitória community of the Moviment Sense Sostre in Diamantina (Brazil)
Funding institution	Centre de Cooperació per al Desenvolupament de la UPC
Reference	CCD-2023-A027
Start-up date	01/03/2023
Completion date	31/03/2025

Summary

The aim of the project is to disseminate and support the initial implementation of a sustainable self-construction technique in order to improve the paving of the streets and homes of a low-income neighborhood located in Diamantina, state of Minas Gerais in Brazil. Through the collaboration of the Universitat Federal dos Vales de Jequitinhonha e Mucuri (UFVJM), a small factory for self-production of earth-cement slabs will be built consisting of a roof, floor and installation of equipment for self-production of the tiles. Subsequently, training workshops will be held so that the community can self-produce the tiles and learn how to install them. Initially, an outdoor space of 200 m2 will be paved where community dining rooms are located. Once the training workshops have been carried out, it is intended that the community itself can enjoy the benefits of these facilities for future improvements in the paving of common areas of the neighborhood and their own homes and can even use them to manufacture and sell tiles and generate a small income for the families of the community. Finally, dissemination will be carried out both within and outside the academic world so that this experience can be replicated in other communities.

Head researcher	DOMENECH LEGA. BRUNO
Title	Knowledge integration actions in rural electrification for the indigenous population of Cochabamba (Bolivia) and La Guajira (Colombia).
Funding institution	UPC's Centre for Development Cooperation
Reference	CCD-2025-A017
Start-up date	14/07/2025
Completion date	27/07/2025

Summary

The objective of this project is to conduct co-creation workshops on alternative energy sources to train the indigenous populations of La Guajira (Colombia) and Cochabamba (Bolivia). In La Guajira, a new edition of the workshop held last year will take place, but in a format where the Universidad de La Guajira will take on a leadership role, with reduced participation from UPC, aiming to ensure the continuity of the initiative without external dependency. At the same time, the workshop will be replicated in Cochabamba with the support of Universidad Mayor de San Simón, adapting the methodology to the new context. Thus, the project will contribute to empowering local communities in the planning, management, and maintenance of sustainable solutions for rural electrification.

Head researcher	DOMENECH LEGA. BRUNO
Title	Multi-criteria optimisation and artificial intelligence for the design and operation of energy communities
Funding institution	Agencia Estatal de Investigación
Reference	PID2023-151210OB-I00
Start-up date	01/09/2024
Completion date	31/08/2027

Summary

Energy communities (CE) help to mitigate climate change and migrate towards an environmentally and socially sustainable energy model, promoting the use of renewable sources with the active participation of society. The legislation allows citizens to generate, store and sell their own electricity (prosumers), as well as the direct purchase-sale between consumers (peer-to-peer). CE promoting entities and the scientific literature are starting to develop decision-making support tools, but they do not include all aspects of the problem and focus mainly on techno-economic aspects. Thus, more inclusive energy models are needed, which include environmental and social issues, as well as the gender perspective.

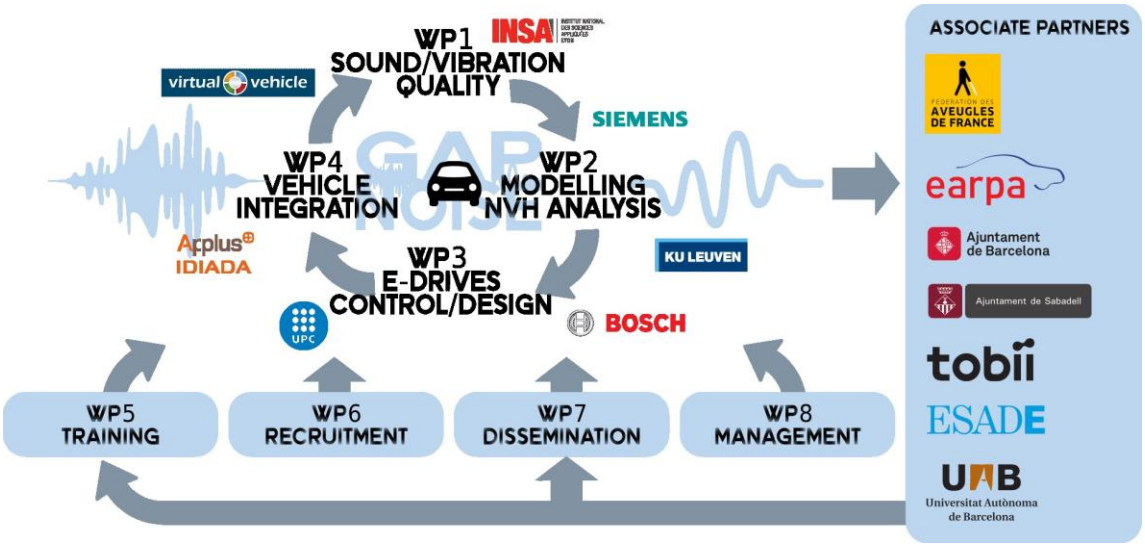
In this context, the objective of the OptIAComE project is to solve the design and operation of CE. Specifically, given a set of consumption points (homes, shops, schools, public centers, etc.) that want to form a CE, to solve the problems of: (a) determine in which points of the community to install generation and/ or storage equipment, of what size, and at what time of the planning horizon; (b) manage the distribution of the renewable generation obtained and the purchase-sale of electricity between users, as well as with the electrical network; and (c) propose options for adapting the consumption profile of the users to take advantage of the renewable generation. For its resolution, optimization models, artificial intelligence algorithms and multicriteria techniques will be used, which will be integrated into a computer tool to support decision-making. As the main novelties, the design and the operation will be solved in a coordinated manner, studying how the design decisions influence the operation ones, and vice versa, integrating the detailed study of each generation/consumption point in the CE analysis at community level, and an including an environmental-social analysis, in addition to the common techno-economic one, to improve the impact of the CE.

Scientific coordinator: Domenech, B.. Participants: Muggi Cisneros, A.. **Ajut predoctoral FD MINISTERI 2024 PRE2023-001990**. 01/05/2025-30/04/2029. Duration: 04.00.00. Funding: 115200.0€. Scope: National. Entity where it is developed: Department of Mechanical Engineering. Funding entities: Ministerio de Ciencia e Innovación.

Head researcher	DÒRIA-CEREZO, ARNAU
Title	GAP_Noise, Global Acoustic interaction and Psychoacoustic impact of the autonomous vehicles in interior and exterior
Funding institution	Commission of European Communities
Reference	HORIZON-101073014-GAP_Noise
Start-up date	01/03/2023
Completion date	28/02/2027

Summary

The goal of this Doctoral Network is to create an interdisciplinary research training network to address the major challenge of sound shaping for safety in electric vehicles. The research program would include research topics such as sound quality and NVH, advanced automatic control, multi-physics modeling, vehicle integration and functional safety, multi-disciplinary co-design, and multi-domain optimization.



Head researcher	FERRER-MARTÍ, LAIA
Title	Design and optimisation of processes and services
Funding institution	AGAUR. Agència de Gestió d'Ajuts Universitaris i de Recerca
Reference	
Start-up date	01/01/2022
Completion date	30/06/2025

Summary

The group specializes in problems related to the design and management of the supply chain (Supply Chain), including the management of operations in the supply chain, in all types of organizations. The mission of the group is to promote and develop research on the Supply Chain and thus contribute to the improvement of the economic and environmental efficiency of organizations, specifically in the processes of supply, production, distribution, recovery and remanufacturing or recycling.

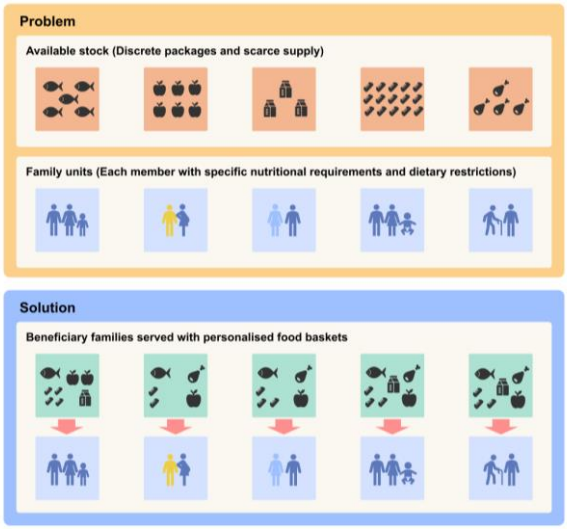
Head researcher	GIL FIGUEROLA. POL
Title	Multi-level optimisation of food aid: strategic, tactical and operational integration.
Funding institution	Universitat Politècnica de Catalunya
Reference	CCD-2025-B016
Start-up date	07/05/2025
Completion date	31/05/2027

Summary

This CCD project develops optimization and decision-support tools to improve food aid allocation across local and international contexts, bridging operational decisions (what goes into a basket) with more strategic planning (how to design feasible, impactful diet baskets under competing objectives). At the local level, we build on the collaboration with El Rebost (Terrassa) to optimize personalized food baskets under scarce and irregular donations, explicitly accounting for individual nutritional requirements, dietary restrictions, discrete package allocation, product variety, and equity, with this work consolidated in our published Computers & Industrial Engineering (CAIE) article using real weekly instances from El Rebost.

At the international level, in partnership with the United Nations World Food Programme (WFP) and Zero Hunger Lab, we develop a multi-objective diet-basket design and selection framework (cost, environmental impact, and deviation from current consumption patterns) and apply it to the Cambodia case study to transparently explore trade-offs and identify compromise solutions suitable for policy deliberation rather than prescribing a single "best" diet.

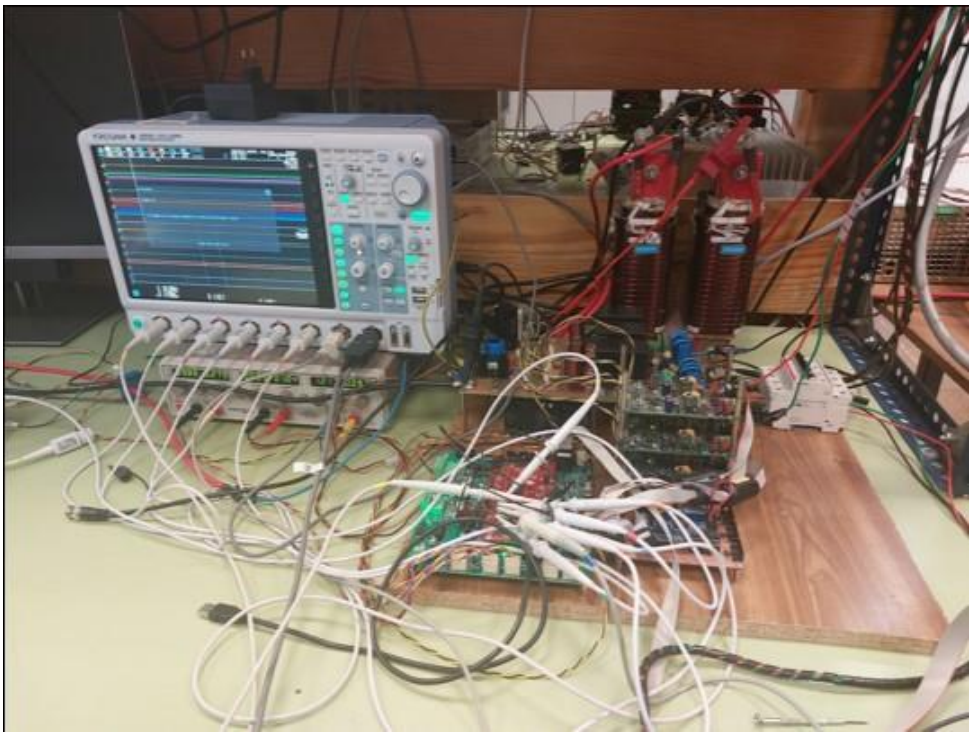
The project has produced one published paper (CAIE) and one paper currently under review (Food Policy submission), and it is framed as a multi-level contribution to improving the nutritional effectiveness, fairness, and operational feasibility of food assistance. This work also underpins SmartBasket, an operational decision-support tool that converts weekly donation inventories and beneficiary profiles into feasible, explainable, and nutritionally balanced basket recommendations for day-to-day pantry distribution.



Head researcher	GRIÑÓ CUBERO, ROBERT- DÒRIA-CEREZO, ARNAU
Title	ACoCSI, Advanced control of single-phase and three-phase Current Source Inverters (CSI)
Funding institution	Agencia Estatal de Investigación
Reference	PID2021-122821NB-I00
Start-up date	01/09/2022
Completion date	31/08/2026

Summary

The ACoCSI project aims to contribute to new control algorithms to improve the performance of the new generation of CSIs. The project will test CSIs in two different applications: the control of a permanent-magnet synchronous motor (PMSM) and PV power conversion systems. During the project, five different CSIs will be assembled: a drive for a PMSM to be tested with the electrical motors in the laboratory and single- and three-phase CSIs for PV applications for both isolated and grid-connected operation. To increase the performance of the power conversion, the project ACoCSI will adapt, according to the requirements of each application, advanced techniques for the design of controllers. The expected control advances along the project are not limited to CSIs, but they can also be useful for other converter topologies.



Head researcher	GRIÑÓ CUBERO, ROBERT
Title	Advanced Control and Power Electronics (ACaPE)
Funding institution	AGAUR. Agència de Gestió d'Ajuts Universitaris i de Recerca
Reference	2021 SGR 00376
Start-up date	01/01/2022
Completion date	31/12/2024

Summary

ACaPE is a research group with a long experience in the analysis, design and implementation of advanced control systems, with special emphasis on power electronic converters. The group's research focuses on the modelling and control of complex systems, and their application to problems related to the generation, conditioning, management and storage of electrical energy. New multilevel conversion techniques and modulation and control algorithms are also used to improve the performance of conventional renewable energy systems such as photovoltaic systems, wind power systems and electric and hybrid vehicles.

Head researcher	HATAMI. SARA
Title	Data Science for Informed Decision-Making in the Packaging Sector
Funding institution	AGAUR. Agència de Gestió d'Ajuts Universitaris i de Recerca
Reference	2023 DI 017
Start-up date	08/01/2024
Completion date	07/01/2027

Summary

The project titled "Data Science for Informed Decision-Making in the Packaging Sector" is part of the Industrial Doctorates Program of the Government of Catalonia, in collaboration with the Polytechnic University of Catalonia (UPC). It is currently in its second year of development and has achieved significant progress toward its objectives.

During this stage, an in-depth analysis of the problems affecting the production process in the packaging sector has been carried out. This work has not only enabled the identification and classification of the different types of challenges to be addressed, but has also facilitated a clear representation of the existing workflows, serving as a foundation for designing the target process model the project aims to implement.

At the same time, the research plan has been successfully defended before the corresponding academic committee, consolidating the methodological foundations of the project and validating its scientific and industrial approach. These advances lay the groundwork for the development of data science and artificial intelligence-based tools aimed at optimizing decision-making in complex industrial environments.

Head researcher	HATAMI. SARA
Title	Intelligent Algorithms, Data Analytics & Internet Systems
Funding institution	AGAUR. Agència de Gestió d'Ajuts Universitaris i de Recerca
Reference	2021 SGR 01382
Start-up date	01/01/2022
Completion date	30/06/2025

Summary

The IA-DAIS group (*Artificial Intelligence – Data Analytics and Intelligent Systems*) has been recognized as an SGR Group, certifying its excellence in research and development in the fields of artificial intelligence, optimization, simulation, and data analysis. Activities are focused on the application of these technologies to key sectors such as logistics, urban mobility, healthcare, and transportation, addressing complex challenges through innovative approaches.

Throughout 2023-2024, the group has made a notable impact on the scientific community, with more than 50 publications in highly prestigious international journals and conferences.

Among the group's highlighted research lines are:

- Optimization and simulation in logistics and transportation: Application of simheuristics and learnheuristics to mobility problems, route planning, and resource management.
- Artificial intelligence and data science: Use of machine learning models for predictive analysis in sectors such as healthcare, smart cities, and energy.
- Human-machine interaction and conversational agents: Design of empathetic chatbots and pedagogical agents to improve teaching and user experience.

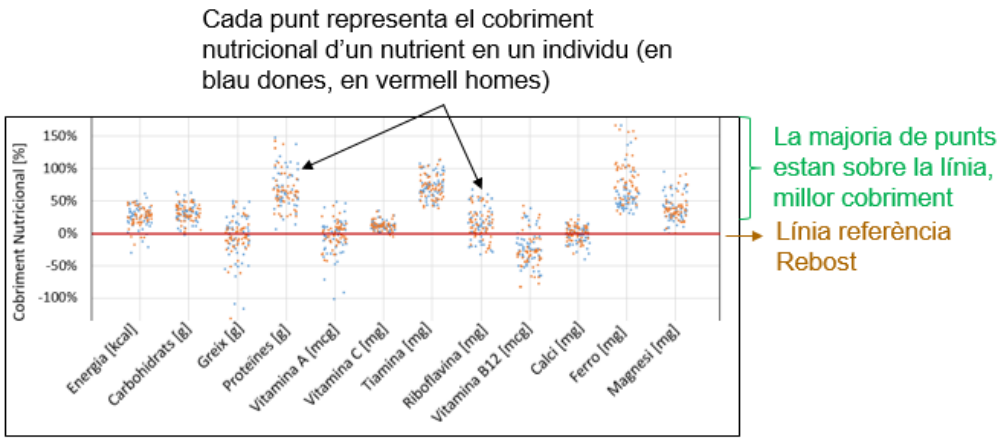
Additionally, as part of the group's activities, the Industrial Doctoral Thesis of Jonás Fuentes León was defended, titled: *"Simulation as a Key Element for Intelligent Algorithm Development in Complex Logistic Applications."* This thesis reflects the key role of simulation in the design of intelligent algorithms to solve complex problems in logistics and transportation.

Head researcher	JUANPERA GALLEL, MARC
Title	Optimising the social distribution of food: improving the nutrition of people in vulnerable situations.
Funding institution	Centre de Cooperació per al Desenvolupament de la UPC
Reference	CCD2023-B003
Start-up date	01/06/2023
Completion date	31/05/2025

Summary

According to the latest data from the United Nations, in 2021, it is estimated that 768 million people suffered from food insecurity worldwide. This problem mainly affects developing countries, but the numbers in countries of the global north are also becoming very relevant. This project aims to develop quantitative tools, based on mathematical models, to optimize the social distribution of food and improve the nutrition of vulnerable people. Efforts will focus on three levels. On a local level, the composition of the baskets distributed to families will be optimised, taking into account individual needs. On a state level, the food distribution from food banks to distribution centers will be optimized. On an international level, we will work together with the World Food Program to define a multi-criteria procedure to select the most appropriate intervention that a country like Nigeria can do to improve the nutrition of certain vulnerable groups, such as children, pregnant and lactating women or elderly people.

Solució de la composició de les cistelles.
Millora del cobriment nutricional actual del Rebost



Head researcher	OLIVELLA NADAL, JORDI
Title	Inclusive entrepreneurship and innovation action for vulnerable communities.
Funding institution	UPC's Centre for Development Cooperation
Reference	
Start-up date	21/07/2025
Completion date	28/02/2026

Summary

This project, conducted in Cliza (Bolivia) in July 2024, consisted of an innovation workshop for female entrepreneurs from the Valle Alto. A collaboration between the UPC and the NGO Ciudadanía, the initiative applied a methodology based on the integration of knowledge and local expertise.

The participants, from sectors such as livestock, baking, and textiles, analyzed their processes and economic challenges. By leveraging social media and artificial intelligence, they sought new ideas and commercial strategies. The workshop culminated in the creation of individual, realistic, and short-term improvement plans. The final objective was to strengthen their economic autonomy and professionalize their businesses from the ground up.

Head researcher	OLIVELLA NADAL, JORDI
Title	Integration of Knowledge Actions with Leaders of Indigenous Communities in La Guajira for Technology Implementation.
Funding institution	UPC's Centre for Development Cooperation
Reference	
Start-up date	01/07/2024
Completion date	28/02/2025

Summary

It was observed that cooperation projects, particularly the adoption of technologies, often had reduced long-term sustainability due to a lack of training for the local population. The project aimed to develop technical training activities in the fields of energy and process innovation and improvement, targeting leaders of indigenous communities in La Guajira, Colombia. These activities were carried out in conjunction with professors from the Universidad de La Guajira, so that in the future, these professors could develop them independently. Additionally, the methodology was tested for proposals in competitive calls. Finally, a teaching case study on the same topic was prepared: the need for training for the implementation of technologies in the context of development cooperation activities.

Head researcher	OLIVELLA NADAL, JORDI
Title	Capacity Building in Higher Education ERASMUS+ project, Modernising Digital Education in Energy Transition for Circular Economy in Latin America. ERASMUS-EDU-2022-CBHE-STRAND-2 (101081473).
Funding institution	Commission of European Communities
Reference	EU-BEGP ERASMUS-EDU-2022-CBHE-STRAND-2
Start-up date	15/02/2023
Completion date	14/02/2026

Summary

In the EU-BEGP project nine universities in Latin America (Bolivia, Ecuador, Guatemala, Peru) will collaborate with two universities in EU (France, Spain) towards modernisation of courses and programs in the energy sector, with emphasis upon circular economy towards energy sustainability. The collaboration is inspired by two earlier successful Erasmus+ CBHE projects. It will re-use both the framework and learning material developed from these projects while developing and implementing specific new courses and programs adapted for the local conditions in the partner countries. More specifically it will significantly enhance capacity building on an educator-to-educator basis towards a significant modernisation of energy curriculum in the partner countries. The project will contribute on the paradigm shift towards global-but-local student-centred education in a digital and online learning environment.

The EU-BGEP project will allow collaborative creation of learning material to create/update programs and courses, which includes a baseline of 3 Master programs, 1 "Diplomado" program, 3 expert courses, 15 courses, and 7 short courses, with more than 1000 expected students to be trained at the end of the project in all the partner countries. Furthermore, 10 remote labs will be implemented, enabling real experimental experience to students in remote areas, and 10 entrepreneurial challenges will be run in collaboration with local industries, thus contributing to the employability of young professionals. A specific Quality Improvement Process, with transnational and global peer review, will be implemented throughout all the learning resources, ranging from individual modules through courses and full programs. A significant strength of the EU-BEGP project is that it is part of an intended global collaboration of online digital learning resources, courses, and programs in the energy sector (the "EXPLORE Energy Digital Academy").

All material developed will be included in this framework and the EU-BEGP consortium will have full access to all the already existing, and to be developed, high-quality material. Such global collaboration takes this Erasmus+ CBHE project to a higher level by projects building upon each other, strongly increasing the impact far beyond what an isolated CBHE project would reach.

Head researcher	OLIVELLA NADAL, JORDI
Title	Europe-Brazil-Bolivia-Cuba Capacity Building using globally available digital learning modules.
Funding institution	Commission of European Communities
Reference	618925-EPP-1-2020-BR-EPPKA2-CBHE-JP
Start-up date	15/01/2021
Completion date	14/01/2024

Summary

EUBBC is a digital education skills training project aimed at three Latin American countries with different needs and developments in digital education: Brazil, Bolivia, Cuba and five European Union participants.

Head researcher	OLM MIRAS, JOSEP MARIA
Title	Distributed control strategies for the traffic management of AGV-based in-house transportation systems.
Funding institution	AGAUR. Agència de Gestió d'Ajuts Universitaris i de
Reference	2021 DI 016
Start-up date	08/11/2021
Completion date	07/11/2025

Summary

The deployment of Automated Guided Vehicles (AGV) to carry out in-house transportation tasks is a key element to improve efficiency in the logistics of Industry 5.0-inspired smart factories. However, the standard requirements of logistics schemes such as flexibility, reconfigurability, reusability, scalability or energy-efficiency, pose a number of challenging open –from the optimality side– control problems to be addressed. The thesis will be focused on the development of distributed control strategies for the traffic management of AGV-based in-house transportation systems encompassing: (a) the task scheduling and route planning of the fleet in an integrated fashion and with a high level of decentralization, and (b) the route execution of the individual AGVs during operation in potentially mixed scenarios with improved collision avoidance and deadlock properties.

Head researcher	PEÑA CARRERA, MARTA
Title	Assessment and implementation of Agriculture and Life Science Universities' first Gender Equality plans in Widening Countries. HORIZON-WIDERA-2022-ERA-01 Coordination and Support Action 101094158.
Funding institution	Commission of European Communities
Reference	HORIZON-101094158-AGRIGEP
Start-up date	01/01/2023
Completion date	31/12/2025

Summary

Across the EU, the development of Gender Equality Plans (GEP) intends to address the problems at RPOs; however, the variability in capability, capacity, and expertise hinder the efficient implementation of the institutional GEPs. Additionally, there are specific GE issues within certain fields of study at research and education institutions. In this context, GE issues in the Science, Technology, Engineering and Mathematics (STEM) fields are well known and specific action plans have been developed. Within STEM, agriculture and life-science focused RPOs face very similar problems, but they lack sector-specific measures and mitigation plans. Furthermore, in agriculture, a large GE sector-specific imbalance exists in developing countries where a relevant proportion of RPOs' international students come from.

The AGRIGEP project, with the joint efforts of six consortium partners, aims to perform a responsible assessment of widening RPOs' current status on GEP implementation, improve capabilities through intensive capacity building, and develop and implement an agriculture and life-science targeted GEP with sectorial specific measures and strategies. These results could lead to long-term institutional reforms. Additionally, this project works to establish the inclusion of GE issues within the RPOs' educational system and professional training of students. The realisation of these objectives and the implementation of inclusive GEPs will enhance the inclusiveness, reputation, attractiveness, and research excellence of widening country RPOs. Moreover, it will promote the transformation of institutions and advance GE within the ERA as well.

Head researcher	PEÑA CARRERA. MARTA
Title	Social impact of STEM
Funding institution	AGAUR. Agència de Gestió d'Ajuts Universitaris i de Recerca
Reference	
Start-up date	01/01/2022
Completion date	30/06/2025

Summary

SOC-STEM research group aims to promote the STEM (Science, Technology, Engineering and Mathematics) disciplines from their social side. One way to achieve greater motivation of STEM students, from a didactic point of view, is through contextualization, illustrating the teaching of basic sciences through technological or engineering applications. On the other hand, it is well known that the STEM disciplines are fields where students have strong biases. It is necessary to know the reasons that cause a lower representation of certain groups and its historical basis (for reasons of gender, race, culture, economic level…) in order to design tools that contribute to equal opportunities. Likewise, it is intended to promote the study of scientific, technical and industrial cultural heritage with the aim of making visible the historical impact that science and technology have had on our society and as a basic tool for humanistic training in the STEM disciplines.

Head researcher	SEBASTIEN PONSICH, ANTONIN
Title	Sustainable solutions for the assessment, design, and planning of electrification projects in rural areas of South American countries II
Funding institution	UPC's Centre for Development Cooperation
Reference	
Start-up date	01/06/2025
Completion date	31/05/2027

Summary

For more than 13 years, the DOPS research group has been developing a line of research in support of rural electrification promoters in developing countries, for the design of isolated projects with renewable energies. Currently, DOPS has extended this line to the evaluation of already implemented projects and energy planning at a regional level. These three types of problems are based on multi-criteria computational methodologies, which take into account all dimensions of sustainability, with a particular focus on environmental protection and the promotion of gender equality. The project is considered to be developed in two Latin American countries, Bolivia and Colombia, both in an energy development phase, where electrification plans, assessment processes and new system design tools are required. This project aims to identify relevant practices and constraints in order to extrapolate the results to other contexts around the world.

Head researcher	SEBASTIEN PONSICH, ANTONIN
Title	Sustainable solutions for the evaluation, design and planning of electrification projects in rural areas of South American countries.
Funding institution	Centre de Cooperació per al Desenvolupament de la UPC
Reference	CCD-2023-B009
Start-up date	01/06/2023
Completion date	31/05/2025

Summary

For more than 12 years, the DOPS group has been developing a research line to support rural electrification promoters in developing countries in the design of renewable energy projects. Currently, DOPS has extended this line to the evaluation of already implemented projects and energy planning at a regional or district level. The three types of problems (assessment, design and planning) are based on multi-criteria computational methodologies that take into account all dimensions of sustainability, with a particular focus on environmental protection and the promotion of gender equality. Projects are considered in three Latin American countries: Brazil, where national programs provide a multitude of case studies to evaluate; Colombia and Bolivia, in the energy development phase, where electrification plans and processes of evaluation and design of new systems are required. This project aims to identify relevant practices and conditions in order to extrapolate the results to other contexts around the world.

Head researcher	ROSELL GRATACÒS. JAN / ZAPLANA AGUT, ISIAH
Title	Research into new technologies to foster a new domestic industry for autonomous robotic solutions

Funding institution	Agencia Estatal de Investigación
Reference	PLEC2023-010360
Start-up date	01/01/2024
Completion date	31/12/2027

Summary

The CENTAURO project aims to improve productivity in Spain through the development of proprietary technology in the field of intelligent robotics, specifically in so-called "mobile manipulators"—autonomous robotic solutions capable of moving within a production environment to assist with or perform various tasks, including those that require skilled labor.
The objective is to develop autonomous and versatile robotic systems capable of navigating an environment and interacting with it by integrating advanced computing capabilities and ubiquitous communication, as well as through advances in distributed computing and the standardization of robot programming and communication technologies.

Head researcher	SUAREZ FEIJOO, RAUL
Title	Resilient manufacturing lines based on smart handling systems - Smarthandle
Funding institution	Commission of European Communities
Reference	HORIZON-101091792-SMARTHANDLE
Start-up date	01/01/2023
Completion date	31/12/2025

Summary

Manual and automated production lines must evolve to "produce more and diverse with less", however they need to address shortcomings such as:

- High product variants requiring tool level dexterity and resource level reconfigurability
- Lack of cognitive perception systems to allow autonomous reasoning and operation
- Absence of adaptable control to accurately handle a variety of workpieces and materials, and
- Inefficiency of planning systems in addressing holistically all hierarchical production levels.

SMARTHANDLE will research technologies to address these needs and support European industry, by implementing:

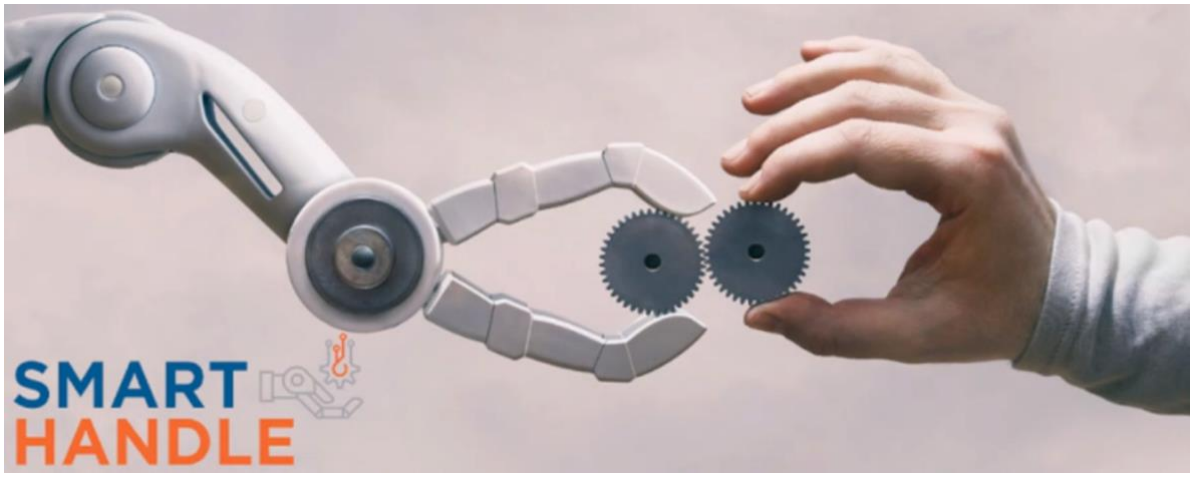
a) intelligent, reconfigurable agents to provide dexterity in a range of handling applications,

b) AI based reasoning enablers to optimize the flexibility potential of these agents

c) Higher-level planning and coordination mechanism to allow the successful and scalable deployment of such solutions in real life use cases.

SMARTHANDLE is a research and innovation action (RIA), nevertheless, it acknowledges that such technologies can be meaningful only if they lead to solutions that address real life needs. Thus it has engaged 3 use cases from the consumer goods (handling of deformable, delicate and high precision parts: contact lenses), Metal Industries (packaging of large variable section materials: aluminum profiles) and automotive tier-1 suppliers (disassembly of complex products: batteries) involving dexterous operations that are not possible to implement with the existing technologies. SSH aspects will be addressed, demonstrating benefits for workers by reducing their involvement in unsafe and unhealthy tasks, improving their working conditions when working in areas where the SMARTHANDLE reconfigurable solutions will operate.

The SMARTHANDLE consortium is made up of 14 European Partners from Belgium (1), Germany (2), Greece (3), Luxemburg (1), Netherlands (4), Spain (3):



Head researcher	SUAREZ FEIJOO, RAUL
Title	AI-Powered Manipulation System for Advanced Robotic Service, Manufacturing and Prosthetics - Intelliman
Funding institution	Commission of European Communities
Reference	HORIZON-101070136-IntelliMan
Start-up date	01/09/2022
Completion date	30/04/2026

Summary

A key challenge in intelligent robotics is creating robots that are capable of directly interacting with the world around them to achieve their goals. On the other hand, robot manipulation is central to achieve the promise of robotics, since the definition of robot requires that it has actuators that it can use to change the world. In the last decades, a substantial growth has been observed in research on the problem of robot manipulation, which aims to exploit the increasing availability of affordable robot arms and grippers to create machines capable of directly and autonomously interacting with the world to implement useful applications. Learning will be central to such autonomous systems, as the real world contains too many variations for a robot to have an accurate model of human requests and behaviour, of the surrounding environment, the objects in it, or the skills required to manipulate them, in advance.

The main objective of the IntelliMan project is focusing on the question of "How a robot can efficiently learn to manipulate in a purposeful and highly performant way". IntelliMan will range from learning individual manipulation skills from human demonstration, to learning abstract descriptions of a manipulation task suitable for high-level planning, to discovering an object's functionality by interacting with it, to guarantee performance and safety. IntelliMan aims at developing a novel AI-Powered Manipulation System with persistent learning capabilities, able to perceive the main characteristics and features of its surrounding by means of a heterogeneous set of sensors, able to decide how to execute a task in an autonomous way and able to detect failures in the task execution in order to request new knowledge through the interaction with humans and the environment. IntelliMan further investigates how such AI-powered manipulation systems are perceived by the users and what factors enhance human acceptability.

The IntelliMan consortium is made up of 13 European Partners from Germany (3), Italy (4), Slovenia (1) and Spain (2), Switzerland (2) United Kingdom (1)

Head researcher	SUÁREZ FEIJOO, RAÚL
Title	Service and Industrial Robotics - Operation, Production and interprise.
Approval institution	AGAUR. Agència de Gestió d'Ajuts
Reference	
Start-up date	01/01/2022
Completion date	30/06/2025

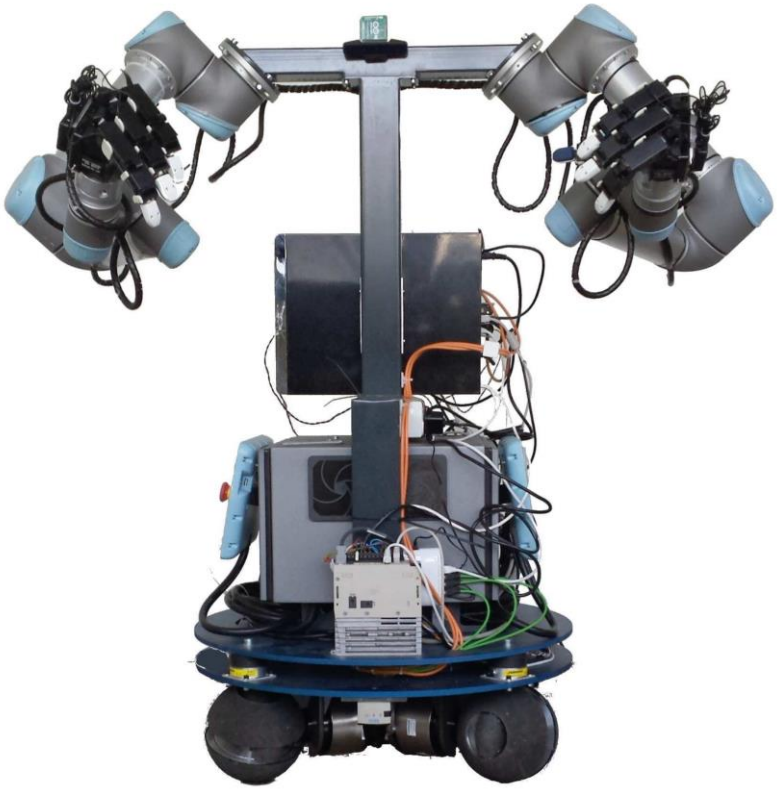
Summary

The research activity of the group is focused in three main lines, which even having their own particularities are not disjoint, this allows interactions and sharing the way the problems are addressed. One line of research is focused on industrial and service robotics, particularly on dexterous manipulation and task and motion planning, considering bimanual mobile manipulators with anthropomorphic structure and artificial intelligence techniques. Another line is focused on the model, management and control problems in the chain of productive operations in various industrial sectors, considering the influence of the human factor and uncertainty on production. Finally, the third research line is focused on rehabilitation and simulation of stroke survivors, and the development of medical devices.

Head researcher	SUÁREZ FEIJOO, RAÚL/ ROSELL GRATACOS,JAN
Title	Core Capabilities for Robot Co-workers (CaRo)
Funding institution	Agencia Estatal de Investigación
Reference	PID2020-114819GB-I00
Start-up date	01/09/2021
Completion date	31/08/2025

Summary

"Full automation" with "fully autonomous, intelligent and dexterous robots" is commonly presented as the ultimate goal of robotic automation. However, there are examples that show that robots have not yet achieved the intelligence and skills needed to solve some tasks, particularly when uncertainty (from different sources) is significant, or, if the robots can solve the tasks, they are very inefficient. This has led to the concept of robot co-worker, a robot "sufficiently skillful and intelligent" and "sufficiently autonomous" destined to work as a collaborator of the human being, who has the necessary knowledge and capabilities to seek for solutions to solve the tasks in certain situations.



The concept of robot co-worker is not new, and it is more and more significant in the current state of robotics, although many different technical requirements are still far away from being solved. A robot co-worker should be prepared to work jointly with the human in work spaces not adapted to it (at least not fully) but rather adapted to the human, and the robot should be able to act in such a way that the efficiency of the work done jointly with the human is greater than that of the work of both working separately. This implies that the robot co-workers must have specific capabilities (regarding intelligence and skills) to be autonomous

enough during their collaboration with humans. In this line, the general objective of the project is to advance in the development of core capabilities for dual-arm robot co-workers, developing tools to provide the robots with manipulation capabilities that make them: a) able to work in semi-structured human environments and cope with uncertainty in the knowledge of the state of the environment and in the action outcomes; b) able to successfully execute a sequence of actions despite potential variations in the environment; c) able to fluently interact with other robots and with humans, trying to perform human-like movements to facilitate the interaction, d) able to exploit the dexterity given by two mechanical hands. Following this general objective, the project aims to contribute according to the following specific objectives: a) Development of tools for perception and reasoning, from the point of view of the information processing to understand the environment and the current situation of the task to be solved; b) Development of adaptive and dynamic methods for planning tasks and movements taking into account the uncertainty in the state of the environment, generating plans that can be adapted flexibly and quickly to the real situation of the environment to avoid replanning; c) Development of robust strategies for bi-manual grasping and manipulation, with particular emphasis on in-two-hand manipulation; and, d) Exploit the current fast state-of-the-art communication technologies, like 5G, in the communications between an operator and a robot, between robots, or between a robot and a distributed computer system. The proposed solutions will be validated in a real experimental setup specifically prepared in the project, including a dual-arm robot with dexterous capabilities that will be used as robot co-worker. Finally, as in all the developments of the group, the problems will be addressed looking for general solutions valid for industrial as well as for service robotics.

Head researcher	SUÁREZ FEIJOO, RAÚL (at IOC)
Title	Industrial Doctorate Training Network on Future Wireless Connected and Automated Industry enabled by 5G.
Funding institution	Commission of European Communities
Reference	H2020-956670-5GSmartFact
Start-up date	01/03/2021
Completion date	28/02/2025

Summary

5GSmartFact is an MSCA-ITN project funded by the EU whose objective is to study, develop, optimize and assess the deployment of 5G networks that target the IIoT requirements (in terms of availability, ultra-low latency, reliability, amount of supported devices, localization accuracy and energy efficiency) in factory environments, and exploit them to integrate factory applications (especially those related to robot-control and robot navigation) which might lead to a complete redesign of networked robot architectures and hence to a leap forward in the industry automation .

Agreements with companies

Head researcher	ARIAS PUJOL, ANTONI
Title	Technical support in the control of a three-phase four-wire Active Filter
Funding institution	Vectortech SLU
Reference	
Start-up date	15/12/2023
Completion date	12/12/2025

Summary

The object of the contract is to carry out the services of advice and technical support in:

- Resonant control by active power filters
- Analog hysteresis current control for Active Power Filters
- techniques of fundamental wave isolation and harmonic content through frequency tools
- Supervisory of the development of controls and multilevel modulators (3L) on DSP platforms (TI).

These technical services, are framed within the main objective of designing control and implement (initially) at the simulation level a multilevel active (3n) three branches active three -phase filter.

Head researcher	ARIAS PUJOL, ANTONI
Title	Extension of contract for stability analysis and design of control algorithms for power electronics converters.
Funding institution	Universidad del Pais Vasco
Reference	
Start-up date	30/10/2021
Completion date	30/06/2025

Summary

The purpose of the contract is to design digital algorithms to control for power electronics converters working in "Flexible Power Links (FPL)". The project is still on-going and hopefully will bring experimental results in the next year.

Head researcher	DORIA CEREZO, ARNAU
Title	Collaboration contract to design and implementation of a control card for the NVH control testing in a powertrain
Funding institution	Nissan Motor Iberica SA
Reference	
Start-up date	08/11/2024
Completion date	31/03/2025

Summary

The objective of this work is to start up a commercial Nissan inverter with the necessary control card changes to modify the configuration and control algorithms of a synchronous motor. The tasks will focus on updating the internal hardware and software to use the inverter in a bench test. The project includes modifying the logic configuration and control algorithms to test different modulation techniques (such as PMWs) in accordance with bench and test requirements. The project will keep the entire power base and include a new control card design with a new microcontroller. The modified inverter will be verified experimentally in the IOC laboratory with a PMSM (up to 2 kW).

Head researcher	LUSA GARCIA, AMAIA
Title	Chair agreement Vanderlande Industries España, S.A.U.
Funding institution	Vanderlande Industries España,S.A.
Reference	
Start-up date	01/05/2022
Completion date	30/04/2025

Summary

Chair with Vanderlande Industries España, S.A.U.-UPC to promote training, research, research transfer and scientific dissemination in the field of logistics process automation (especially in airports and warehouses). The activities of this Chair project include training sessions for students, visits to Vanderlande's factory in Santpedor and the Aeroport Josep Tarradellas Barcelona - El Prat (handling structures and processes), Bachelor and Master thesis challenges and the collaboration with the eRacing ETSEIB team (https://eracingetseib.upc.edu/). More information can be found on the Chair website: https://catedravanderlande.upc.edu

Head researcher	REPECHO DEL CORRAL, VÍCTOR
Title	Collaboration agreement for the analysis of the modular and universal power supply system for audio amplification stages
Funding institution	NEEC Audio Barcelona SL
Reference	
Start-up date	02/09/2024
Completion date	31/07/2026

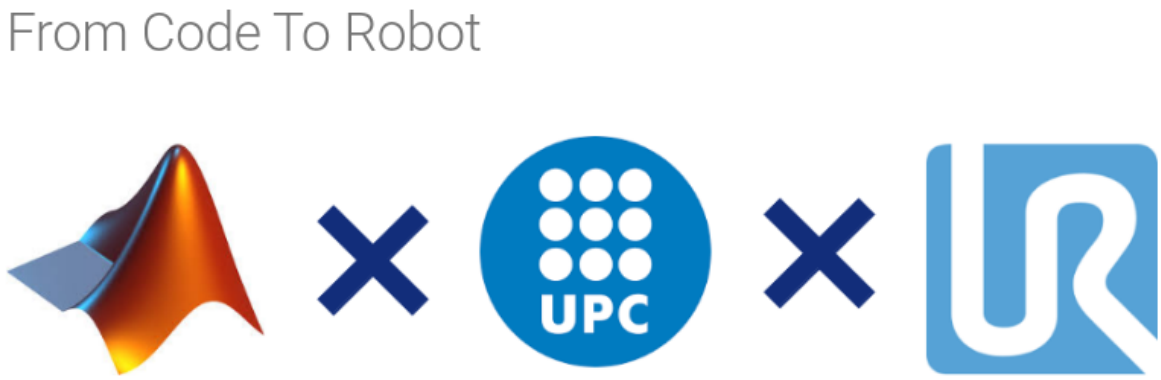
Summary

The collaboration with Ecler (NEEC AUDIO BARCELONA) S.L. are focused on the development of a universal AC/DC power supply that can be paralleled in order to obtain the desired power level for feed D-class audio amplifiers. The idea is to maximize the benefits of multiphase structure as the improvement of efficiency and the reduction of high frequency ripple by means of the utilization of interleaving techniques. The requirements of the final stage is to operate with near unity power factor, low THD levels and isolation.

Head researcher	ROSELL GRATACOS, JAN / ZAPLANA AGUT, ISIAH
Title	From Code To Robot
Funding institution	Universal Robots A/S Mathworks
Reference	
Start-up date	17/02/2025
Completion date	16/02/2026

Summary

"From Code to Robot" is a hands-on curriculum that equips students with practical skills in robotics, computer vision, and artificial intelligence (AI) using MATLAB and Universal Robots (UR) robotic arms. Targeted at students in industrial engineering, computer science, and technology, this curriculum provides a software and hardware framework together with teaching material to supplement theoretical concepts with practical applications, preparing learners for careers in automation, robotics, and intelligent systems. The curriculum is built around three core pillars – Robotics, Computer Vision, and AI – each offering focused, hands-on teaching materials and exercises that deepen students' technical skills. https://teaching.ioc.upc.edu/from-code-to-robot/



Head researcher	ESTEBAN PEÑA PITARCH
Title	Copropietat patent pelvic floor muscle strength measuring device'.
Funding institution	Fundació Althaia
Reference	
Start-up date	25/03/2011
Completion date	25/03/2031

Summary

Device for measuring pelvic floor muscle strength, comprising a speculum (1) formed by two pivoting coupled parts (11, 12), each of said parts with a grip area (31, 32) and a front area (41 , 42) intended to be inserted into the vagina, where a displacement sensor (2) is attached to the front area (31, 32) of the speculum of surface electrodes, with a spring (21) of known constant K, where said spring (21) has a wire diameter between 0.5 and 1 mm, and associated with a displacement reading module (50). It also has a parasitic force measurement system through surface electrodes (52) associated with a force reading module (51).

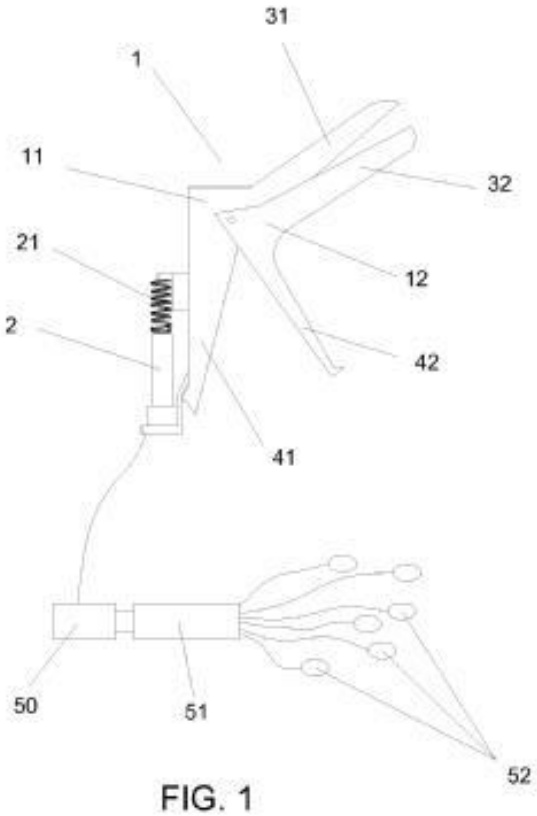


FIG. 1

9. Publications

Journals articles

1. Arévalo, F.; Peña, M.. **Evaluating ensemble models for fair and interpretable prediction in higher education using multimodal data**. *Scientific reports*. 2025. Volume: : 15. Number: 1. DOI: https://doi.org/https://doi.org/10.1038/s41598-025-15388-9. JCR-Science Edition. IF: 3.9. Q1;

2. Arévalo, F.; Peña, M.. **AI-Driven Predictive Models and Chatbots for Early Intervention and Student Success in Higher Education: A Systematic Review**. *International journal of engineering education*. 2025. Volume: : 41. Number: 6. Pages: 1473~1488. JCR-Science Edition. IF: 0.7. Q3;

3. Baltà, R.; Peña, M.; Noelia Olmedo-Torre. **From enrolment to dropout: exploring sex-based disparities in engineering education trajectories**. *Journal of technology and science education*. 2025. Volume: : 15. Number: 2. Pages: 269~288. URL: https://www.jotse.org/index.php/jotse/article/view/3234/952. DOI: https://doi.org/10.3926/jotse.3234. ERIH Plus - European Reference Index for the Humanities and Social Sciences.

4. Batlle, C.; Gomis, J.. **A general action for a particle in 2 + 1 anti-de Sitter space**. *Geometric Mechanics*. 2025. URL: https://www.worldscientific.com/doi/10.1142/S2972458925400015. DOI: https://doi.org/10.1142/S2972458925400015.

5. Bautista, J.. **Análisis de la desproporcionalidad del reparto de poder entre territorios. Caso del Parlamento de Cataluña**. *Dirección y organización. Revista de ingeniería de organización*. 2025. Volume: : Abril 2025. Number: 85. Pages: 5~25. URL: https://www.revistadyo.es/DyO/index.php/dyo/article/view/687. DOI: https://doi.org/10.37610/85.687. SJR - SCImago Journal Rank. IF: 0.185. Q3;

6. Bautista, J.. **Entre templos y fortalezas. Una aventura egipcia de Sherlock Holmes y John H. Watson**. *Tribuna plural: la revista científica*. 2025. Volume: : 28. Number: 14. Pages: 45~65. URL: https://raed.academy/publicaciones/revista-tribuna-plural.

7. Chen, M.; Cecilia, A.; Na, Jing; Batlle, C.; Costa-Castelló, R.. **Metal hydride storage tank state of charge estimation: a switched observer approach**. *IEEE Transactions on control systems technology*. 2025. Pages: 1~12. URL: https://ieeexplore.ieee.org/document/11154134. DOI: https://doi.org/10.1109/TCST.2025.3605666. JCR-Science Edition. IF: 3.9. Q2;

8. Chen, M.; Costa-Castelló, R.; Batlle, C.; Na, Jing. **A two-dimensional state-space model for metal hydride storage tanks and parameter sensitivity analysis**. *IFAC-PapersOnLine*. 2024. Volume: : 58. Number: 21. Pages: 162~167. URL: https://www.sciencedirect.com/science/article/pii/S2405896324019220. DOI: https://doi.org/10.1016/j.ifacol.2024.10.167. CiteScore. IF: 1.8.

9. Cremades, L.V.; Ponsich, A.. **Simple and objective determination of criteria weights for evaluating alternatives when using the analytic hierarchy process**. *International journal of the analytic hierarchy process*. 2025. Volume: : 16. Number: 3. URL: https://ijahp.org/index.php/IJAHP/article/view/1177. DOI: https://doi.org/10.13033/ijahp.v16i3.1177. SJR - SCImago Journal Rank. IF: 0.321. Q3;

10. Di Palo, E.; Olm, Josep M.; Doria-Cerezo, A.; di Bernardo, M.. **Sliding mode control-based synchronization of complex-valued neural networks**. *IEEE transactions on control of network systems*. 2024. Volume: : 11. Number: 1. Pages: 1251~1260. URL: https://ieeexplore.ieee.org/document/10328812. DOI: https://doi.org/10.1109/TCNS.2023.3336830. JCR-Science Edition. IF: 5.0. Q1;

11. Domínguez, M.; Cheah, M.; Arsenijevic, M.; Miletic, M.; Griño, R.; Gomis-Bellmunt, O.. **AC and DC fault-ride-through energy-based control for non-isolated multiport modular multilevel converters**. *IEEE Journal of emerging and selected topics in power electronics*. 2025. Pages: 1~1. URL: https://ieeexplore.ieee.org/document/11284849. DOI: https://doi.org/10.1109/JESTPE.2025.3641704. CiteScore. IF: 12.8.

12. Fang, L.; Ortega, R.; Griño, R.. **Voltage control of the boost converter: PI vs. nonlinear passivity-based control**. *International journal of robust and nonlinear control*. 2025. URL: https://onlinelibrary.wiley.com/doi/10.1002/rnc.70289. DOI: https://doi.org/10.1002/rnc.70289. CiteScore. IF: 6.6.

13. Ghodratnama, A.; Gonzalez, E.; Hatami, S.; Tavakkoli, R.. **Two multi-objective optimization approaches for solving a fuzzy bi-objective distributed hybrid flow shop scheduling problem under uncertainty**. *Arabian Journal for Science and Engineering*. 2025. URL: https://link.springer.com/article/10.1007/s13369-025-10238-2. DOI: https://doi.org/10.1007/s13369-025-10238-2. JCR-Science Edition. IF: 2.6. Q2;

14. Huerta, F.; del Toro, J.; Bueno, E.J; Griño, R.; Cóbreces, S.. **DC interface impedance shaping for DC/AC grid forming converters in railway applications**. *IEEE transactions on transportation electrification*. 2024. Volume: : 11. Number: 2. Pages: 6548~6558. URL: https://ieeexplore.ieee.org/document/10778626. DOI: https://doi.org/10.1109/TTE.2024.3511957. JCR-Science Edition. IF: 8.3. Q1;

15. Javanmardi, N.; Qian, L.; Wei, Z.; Ma, J.; Xu, Y.; Peña-Pitarch, E.; Wang, T.; Feng, Z.. **Effect of microneedle-assisted auricular vagus nerve stimulation on attention**. *Small methods*. 2025. Number: article 2500124. URL: https://onlinelibrary.wiley.com/doi/10.1002/smtd.202500124. DOI: https://doi.org/10.1002/smtd.202500124. JCR-Science Edition. IF: 9.1. Q1;

16. Lo Iudice, F.; Olm, Josep M.; Suarez, R.. **Optimal recharge sequencing in multi-AGV systems: A mixed ILP approach**. *Computers and industrial engineering*. 2024. Volume: : 196. Number: article 110510. Pages: 1~9. URL: https://www.sciencedirect.com/science/article/pii/S0360835224006314. DOI: https://doi.org/10.1016/j.cie.2024.110510. JCR-Science Edition. IF: 6.5. Q1;

17. Maquirriain, J.; García-Villoria, A.; Pastor, Rafael. **MATHEMATICAL PROGRAMMING FOR THE SELECTION OF THE IDEAL CYCLE LENGTH IN PREVENTIVE MAINTENANCE POLICIES**. *Dyna (Bilbao)*. 2025. Volume: : 100. Number: 4. Pages: 357~362. DOI: https://doi.org/10.52152/D11408. JCR-Science Edition. IF: 0.7. Q3;

18. Mas de les Valls, E.; Peña, M.; Lusa, A.; Baltà, R.. **From plans to practice: transformative gender-in-teaching training programs through GEPs in higher education**. *Social Inclusion*. 2025. Volume: : 13. URL: https://www.cogitatiopress.com/socialinclusion/article/view/9969. DOI: https://doi.org/10.17645/si.9969. JCR-Social Sciences Edition. IF: 1.4. Q2;

19. Peña-Pitarch, E.; Ng Yin Kwee, E.. **Preface: advancing medical care through biomechanics and data innovation — part I**. *Journal of mechanics in medicine and biology*. 2025. Volume: : 25. Number: 2, article 2502001. URL: https://doi.org/10.1142/S0219519425020014. DOI: https://doi.org/10.1142/S0219519425020014. CiteScore. IF: 1.4.

20. Peña-Pitarch, E.; Ng Yin Kwee, E.. **Preface: application and progress of biomechanics in medicine - Part III**. *Journal of mechanics in medicine and biology*. 2024. Volume: : 24. Number: 09, article 2402003. Pages: 1~8. URL: https://www.worldscientific.com/doi/10.1142/S0219519424020032. DOI: https://doi.org/10.1142/S0219519424020032. JCR-Science Edition. IF: 0.6. Q4;

21. Peña-Pitarch, E.; Ng Yin Kwee, E.. **Preface: application and progress of biomechanics in medicine - Part II**. *Journal of mechanics in medicine and biology*. 2024. Volume: : 24. Number: 08, article 2402002. Pages: 1~7. URL: https://www.worldscientific.com/doi/10.1142/S0219519424020020. DOI: https://doi.org/10.1142/S0219519424020020. JCR-Science Edition. IF: 0.6. Q4;

22. Ruiz, O.; Dalmases, A.; Zaplana, I.; Rosell, J.. **Smart perception for situation awareness in robotic manipulation tasks**. *IEEE access*. 2024. Volume: : 12. Pages: 53974~53985. URL: https://ieeexplore.ieee.org/document/10500406. DOI: https://doi.org/10.1109/ACCESS.2024.3389091. JCR-Science Edition. IF: 3.6. Q2;

23. Sanchez-Munoz, R.; Depaepe, T.; Samalova, M.; Hejatko, J.; Zaplana, I.; Van Der Straeten, D.. **Machine-learning meta-analysis reveals ethylene as a central component of the molecular core in abiotic stress responses in Arabidopsis**. *Nature communications*. 2025. Volume: : 16. Number: article 4778. URL: https://www.nature.com/articles/s41467-025-59542-3. DOI: https://doi.org/10.1038/s41467-025-59542-3. JCR-Science Edition. IF: 14.7. Q1;

24. Van den Eynde, S.; Waumans, S.; Dimas, T.; Díaz-Romero, D.; Zaplana, I.; Peeters, J.. **Evaluating the effectiveness of density-based sorting of plastics from WEEE and ELVs**. *Resources, conservation and recycling*. 2024. Volume: : 209. Number: article 107753. URL: https://www.sciencedirect.com/science/article/abs/pii/S0921344924003471. DOI: https://doi.org/10.1016/j.resconrec.2024.107753. JCR-Science Edition. IF: 10.9. Q1;

25. Verma, P.; Olm, Josep M.; Suarez, R.. **Effect of layout discretization on the performance of zone control-based multi-AGV traffic management systems**. *Applied sciences (Basel)*. 2024. Volume: : 14. Number: 17, article 7817. URL: https://www.mdpi.com/2076-3417/14/17/7817. DOI: https://doi.org/10.3390/app14177817. JCR-Science Edition. IF: 2.5. Q2;

26. Wei, Z.; Jin, F.; Li, T.; He, Y.; Qian, L.; Ma, J.; Yuan, T.; Yu, X.; Zheng, W.; Javanmardi, N.; Peña-Pitarch, E.; Wang, T.; Xu, J.; Feng, Z.. **Biofluid-permeable and erosion-resistant wireless neural-electronic interfaces for neurohomeostasis modulation**. *ACS nano*. 2025. Volume: : 19. Number: 4. Pages: 4541~4560. URL: https://pubs.acs.org/doi/10.1021/acsnano.4c14320. DOI: https://doi.org/10.1021/acsnano.4c14320. CiteScore. IF: 26.0.

27. Doria-Cerezo, A.; Boira, P.; Repecho, V.; Biel, D.. **Complex sliding averaging control for three-phase power converters**. *IEEE transactions on industrial electronics*. 2025. Pages: 1~12. URL: https://ieeexplore.ieee.org/document/11123152. DOI: https://doi.org/10.1109/TIE.2025.3591667. JCR-Science Edition. IF: 7.2. Q1;

28. Manafi, E.; Domenech, B.; Tavakkoli, R.; Ranaboldo, M.. **A self-learning whale optimization algorithm based on reinforcement learning for a dual-resource flexible job shop scheduling problem**. *Applied soft computing*. 2025. Volume: : 180. Number: 113436. URL: https://www.sciencedirect.com/science/article/pii/S1568494625007471. DOI: https://doi.org/10.1016/j.asoc.2025.113436. JCR-Science Edition. IF: 7.2. Q1;

29. Velasco, M.; Zaplana, I.; Doria-Cerezo, A.; Marti, P.. **Symbolic and user-friendly geometric algebra routines (SUGAR) for computations in Matlab**. *ACM transactions on mathematical software*. 2025. Volume: : 51. Number: 2, article 11. Pages: 1~31. URL: https://dl.acm.org/doi/10.1145/3734693. DOI: https://doi.org/10.1145/3734693. JCR-Science Edition. IF: 3.2. Q1;

30. De León-Ruiz, J.E.; Beltrán, R.; Carvajal, I.; Venegas, M.; Ponsich, A.. **Thermal performance estimation and optimisation of a shallow geothermal compound heat pumping system for combined process heating and cooling**. *Results in engineering*. 2025. Volume: : 26. Number: article 105121. URL: https://www.sciencedirect.com/science/article/pii/S259012302501196X. DOI: https://doi.org/10.1016/j.rineng.2025.105121. CiteScore. IF: 5.8.

31. Gil-Figuerola, P.; Juanpera, M.; Soler-Noguera, A.; Ramalhinho Dias, H.; Ferrer-Martí, L.; Pastor, Rafael. **Optimising food baskets in a local food pantry: the case study of El Rebost**. *Computers & industrial engineering*. 2025. Volume: : 203. Number: 111053. URL: https://www.sciencedirect.com/science/article/pii/S0360835225001998. DOI: https://doi.org/10.1016/j.cie.2025.111053. JCR-Science Edition. IF: 6.7. Q1;

32. Fisco, P.; Juanpera, M.; Domenech, B.; Pastor, Rafael; Ranaboldo, M.; Bullich, E.. **Sustainable optimal production scheduling methodology under implicit demand response and carbon policy: a manufacturing industry case study**. *Applied energy*. 2025. Volume: : 384. Number: article 125403. URL: https://www.sciencedirect.com/science/article/pii/S0306261925001333. DOI: https://doi.org/10.1016/j.apenergy.2025.125403. JCR-Science Edition. IF: 10.1. Q1;

33. Noelia Olmedo-Torre; Peña, M.; Soriano, M.; Pujol Ferran, A.. **Instructional design using PBL active methodologies in the teaching of graphic engineering**. *The interdisciplinary journal of problem-based learning*. 2025. Volume: : 19. Number: 1. Pages: 1~29. URL: https://scholarworks.iu.edu/journals/index.php/ijpbl/article/view/33426. DOI: https://doi.org/10.14434/ijpbl.v19i1.33426. SJR - SCImago Journal Rank. IF: 0.439. Q2;

34. Baltà, R.; El Madafri, I.; Braso, E.; Peña, M.. **Empowering engineering students through artificial intelligence (AI): blended human–AI creative ideation processes with ChatGPT**. *Computer applications in engineering education*. 2025. Volume: : 33. Number: 1, article e22817. URL: https://onlinelibrary.wiley.com/doi/10.1002/cae.22817. DOI: https://doi.org/10.1002/cae.22817. JCR-Science Edition. IF: 2.0. Q2;

35. De La Torre, M.; Calleja, G.; Alcaide, C.. **Fused learning in higher education: bridging distance learning and face-to-face assessment**. *Assessment and evaluation in higher education*. 2024. Volume: : 50. Number: 4. Pages: 550~563. URL: https://www.tandfonline.com/doi/full/10.1080/02602938.2024.2428165. DOI: https://doi.org/10.1080/02602938.2024.2428165. JCR-Social Sciences Edition. IF: 3.8. Q1;

36. Padilla-Magana, J.; Sánchez, I.; Peña-Pitarch, E.. **Classification of human grasp forces in activities of daily living using a deep neural network**. *Bulletin of electrical engineering and informatics*. 2024. Volume: : 13. Number: 6. Pages: 4403~4412. URL: https://beei.org/index.php/EEI/article/view/7181. DOI: https://doi.org/10.11591/eei.v13i6.7181. SJR - SCImago Journal Rank. IF: 0.306. Q3;

37. El Madafri, I.; Peña, M.; Noelia Olmedo-Torre. **Real-time forest fire detection with lightweight CNN using hierarchical multi-task knowledge distillation**. *Fire*. 2024. Volume: : 7. Number: 11, article 392. URL: https://www.mdpi.com/2571-6255/7/11/392. DOI: https://doi.org/10.3390/fire7110392. JCR-Science Edition. IF: 2.7. Q1;

38. Arévalo, F.; Peña, M.. **Comparative analysis of machine learning models for predicting student success in online programming courses: a study based on LMS data and external factors**. *Mathematics*. 2024. Volume: : 12. Number: 20, article 3272. URL: https://www.mdpi.com/2227-7390/12/20/3272. DOI: https://doi.org/10.3390/math12203272. JCR-Science Edition. IF: 2.2. Q1;

39. Ranaboldo, M.; Aragüés, M.; Arica, E.; Bade, A.; Bullich, E.; Burgio, A.; Caccamo, C.; Caprara, A.; Cimmino, D.; Domenech, B.; Donoso, I.; Fragapane, G.; González-Font-de-Rubinat, P.; Jahnke, E.; Juanpera, M.; Manafi, E.; Rövekamp, J.; Tani, R.. **A comprehensive overview of industrial demand response status in Europe**. *Renewable and sustainable energy reviews*. 2024. Volume: : 203. Number: article 114797. URL: https://www.sciencedirect.com/science/article/pii/S1364032124005239. DOI: https://doi.org/10.1016/j.rser.2024.114797. JCR-Science Edition. IF: 16.3. Q1;

40. Anich, N.; Mateo, M.. **The supply of medicines as exemple of a re-design of the distribution network**. *Dyna management*. 2024. Volume: : 12. Number: 1. Pages: 1~9. URL: https://www.dyna-management.com/inicio-management. DOI: https://doi.org/10.52152/DMN10962. ERIH Plus - European Reference Index for the Humanities and Social Sciences.

41. Carreño, M.; Song, Jie; Gomis-Bellmunt, O.; Griño, R.. **Design-oriented large-signal stability analysis of synchronous reference frame phase-locked loop**. *IEEE transactions on power delivery*. 2024. Volume: : 40. Number: 3. Pages: 1235~1243. URL: https://ieeexplore.ieee.org/document/10664459. DOI: https://doi.org/10.1109/TPWRD.2024.3454533. JCR-Science Edition. IF: 3.7. Q2;

Conference publications

1. Aguilar Perez, Marta; Hagström, P.; Jayasuriya, J.; Olivella, J.. **Cultural diversity impact in teamwork in InnoEnergy RENE and SELECT master's programs**. 19th International Technology, Education and Development Conference. 04/03/2025. https://library.iated.org/view/AGUILARPEREZ2025CUL.

2. Agustin, D.; Domenech, B.; Pastor, Rafael. **Actividad práctica basada en la utilización de un MES en una asignatura de organización de la producción**. VI Congreso Internacional de Innovación Docente e Investigación en Educación Superior. 09/11/2024.

3. Alfaro, R.; Bautista, J.. **Balancing assembly lines by regulating exposure to ergonomically hazardous tasks**. 19th International Conference on Industrial Engineering and Industrial Management - XXIX Congreso de Ingeniería de Organización. 01/07/2025.

4. Arévalo, F.; Peña, M.; Ramírez, R.I.. **Predictive analytics and AI chatbots for early academic risk detection and personalized learning support**. 17th International Conference on Education and New Learning Technologies. 30/06/2025. https://library.iated.org/view/AREVALOCORDOVILLA2025PRE?re=downloadnotallowed.

5. Bautista, J.; Alfaro, R.; Lusa, A.. **Heijunka sequencing on assembly lines with product options, work overload and variable working day length**. 19th International Conference on Industrial Engineering and Industrial Management - XXIX Congreso de Ingeniería de Organización. 2025.

6. Bautista, J.; Alfaro, R.. **Heijunka mixed model sequencing problem with no buffers and work overload minimization**. 17th International Conference on Industrial Engineering and Industrial Management - XXVII Congreso de Ingeniería de Organización. 2024.

7. Carreño, M.; Song, J.; Gomis-Bellmunt, O.; Griño, R.. **Identification of the region of attraction synchronous achines and grid-following converters through reverse trajectories**. 15th International Conference on Modeling and Simulation of Electric Machines, Converters and Systems. 2025. https://link.springer.com/chapter/10.1007/978-3-031-73921-7_32.

8. De La Torre, R.; Calleja, G.; Sanchis, R.; Sempere-Ripoll, F.. **Procedure for the design and implementation of activities to work on creativity, entrepreneurship, and innovation in higher education**. 18th International Technology, Education and Development Conference. 2024. https://library.iated.org/publications/INTED2024.

9. De La Torre, R.; Calleja, G.; Sanchís, R.; Mengual-Recuerda, A.. **Inclusive education. A look at the role of inclusion services in reinforcing students with learning disabilities**. 18th International Technology, Education and Development Conference. 2024. https://library.iated.org/view/DELATORRE2024INC.

10. Domínguez, M.; Cheah-Mañé, M.; Griño, R.; Gomis-Bellmunt, O.. **Control of a non-isolated Multiport Converter on normal and AC fault conditions**. 15th International Conference on Modeling and Simulation of Electric Machines, Converters and Systems. 2025.

11. Domínguez, M.; Cheah, M.; Griño, R.; Gomis-Bellmunt, O.. **Multiport power converters to enhance resilience in distribution networks**. CIRED Chicago Workshop 2024: Resilience of Electric Distribution Systems. 11/2024. https://digital-library.theiet.org/doi/abs/10.1049/icp.2024.2581.

12. Fisco, P.; Bullich, E.; Domenech, B.; Juanpera, M.; Pastor, Rafael; Ranaboldo, M.. **Multi-stage optimization flexibility algorithm for demand response in ancillary services. An industrial case study**. CIRED 2024 Vienna Workshop. 01/10/2024.

13. Gallart, R.; Domínguez, M.; Cheah, M.; Griño, R.; Gomis-Bellmunt, O.. **Multiport convertirá en las redes de distribución**. FutuRed 2024 - III Edición Congreso de Redes Inteligentes. 11/2024. https://futured.es.

14. Gonzalez, E.; Londoño, J.; Hatami, S.; Ponsich, A.. **A novel MILP model for the operation of the poultry supply chain**. 11th IFAC Conference on Manufacturing Modelling, Management and Control. 01/07/2025. https://www.sciencedirect.com/science/article/pii/S2405896325011541.

15. Juanpera, M.; Gil-Figuerola, P.; Koenen, M.F.; Kuri, S.; Damu, C.; Ferrer-Martí, L.. **Preventing malnutrition: quantitative tools for decision-making in optimizing diets and interventions for regions with limited economic access to adequate diets**. 33rd European Conference on Operational Research. 2024.

16. Luciano, L.; Doria-Cerezo, A.; Olm, Josep M.. **A sliding mode-based filter for non-stationary signals**. IEEE International Symposium on Circuits and Systems 2025. 26/05/2025. https://ieeexplore.ieee.org/document/11043636.

17. Martrat, C.; Doria-Cerezo, A.; Repecho, V.; Parizet, E.. **Psychoacoustic analysis of a PMSM under different working conditions in the drive system**. 15th Aachen Acoustics Colloquium. 27/11/2024.

18. Matarrodona, P.; Baltà, R.; Peña, M.. **Generative artificial intelligence: a tool to bridge gender gaps in STEM careers**. 48th International Convention on Information and Communication Technology, Electronics and Microelectronics. 2025. https://ieeexplore.ieee.org/document/11131753.

19. Pérez, J.; Santamargarita, D.; Molinero, D.; Huerta, F.; Pizarro, D.; Cóbreces, S.; Griño, R.. **Dual active bridge simultaneous input admittance passivity shaping and reference tracking using low order H-infinity control**. 39th IEEE Applied Power Electronics Conference and Exposition. 2024. https://ieeexplore.ieee.org/document/10509467.

20. Pujol, M.; Palomo-Avellaneda, L.; Suarez, R.. **Software package for efficient use of a robotic anthropomorphic hand**. 29th IEEE International Conference on Emerging Technologies and Factory Automation. 16/10/2024. https://ieeexplore.ieee.org/document/10710748.

21. Ramon, P.; Palomo-Avellaneda, L.; Zaplana, I.; Rosell, J.. **Dual-arm robotic manipulation using visual guidance**. 29th IEEE International Conference on Emerging Technologies and Factory Automation. 16/10/2024. https://ieeexplore.ieee.org/document/10710687.

22. Sanchís, R.; Calleja, G.; Mengual-Recuerda, A.; Andrés, B.. **E-Tutoring in the Post-covid era**. 18th International Technology, Education and Development Conference. 2024. https://library.iated.org/view/SANCHIS2024ETU.

23. Sanchís, R.; De La Torre, R.; Andrés, B.; Calleja, G.. **Proposal of a methodology for the development of final degree projects: a parctical and systematic approach**. 18th International Technology, Education and Development Conference. 2024. https://library.iated.org/view/SANCHIS2024PRO.

24. Shirzadi Maryan, M.; Zaplana, I.; Suarez, R.. **Analytical approach to reorient unknown objects via in-hand manipulation**. 29th IEEE International Conference on Emerging Technologies and Factory Automation. 16/10/2024. https://ieeexplore.ieee.org/document/10711088.

25. Singh, S.; Suppa, M.; Suarez, R.; Rosell, J.. **Hybrid stereo dense depth estimation for robotic tasks in industrial automation**. 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems. 25/12/2024. https://ieeexplore.ieee.org/document/10802129.

26. Verma, P.; Olm, Josep M.; Suarez, R.; Toldrà, P.. **Improved dynamic resource reservation-based AGV traffic control with optimized task allocation**. 29th IEEE International Conference on Emerging Technologies and Factory Automation. 16/10/2024. https://ieeexplore.ieee.org/document/10710993.

27. Zakariapour, P.; Palomo-Avellaneda, L.; Suarez, R.. **Evaluation of grasp quality measures in real grasps**. 29th IEEE International Conference on Emerging Technologies and Factory Automation. 16/10/2024. https://ieeexplore.ieee.org/document/10710348.

28. Peña-Pitarch, E.; A. Al Omar; Alcelay, J. I.; Catala, P.; Sanz-Fraile, H.. **Kinematics of the wrist movement**. 9th International Digital Human Modeling Symposium. 24/08/2025. https://link.springer.com/chapter/10.1007/978-3-032-00839-8_9.

29. Molina, V.; Ruiz, O.; Suarez, R.; Rosell, J.; Zaplana, I.. **Robot situation and task awareness using large language models and ontologies**. 55th Annual IEEE/IFIP International Conference on Dependable Systems and Networks Workshops. 14/07/2025. https://ieeexplore.ieee.org/document/11071598.

30. Juanpera, M.; Gil-Figuerola, P.; González-Surinyach, P.; Ferrer-Martí, L.; Pastor, Rafael. **Optimizing weekly purchases and designing standardized food baskets in food pantries**. 19th International Conference on Industrial Engineering and Industrial Management - XXIX Congreso de Ingeniería de Organización. 01/07/2025.

31. Minguella-Canela, J.; Peña, M.; Boix, O.. **Experiences on digital and additive manufacturing frameworks for engineering teaching and STEM vocations impulse**. 11th Manufacturing Engineering Society International Conference. 18/06/2025.

32. Aguilar Perez, Marta; Hagström, P.; Olivella, J.. **Bridging the gap: effective communication and project leadership in challenge-based learning**. 52nd Annual Conference of the European Society for Engineering Education. 17/01/2025.

33. Fisco, P.; Bullich, E.; Domenech, B.; Juanpera, M.; Pastor, Rafael; Ranaboldo, M.. **The impact of electricity tariffs on optimal production scheduling**. 17th International Conference on Industrial Engineering and Industrial Management - XXVII Congreso de Ingeniería de Organización. 2024.

Book chapters

1. Alfaro, R.; Bautista, J.. **Comparative analysis of assembly line balancing models with ergonomics**. *Organizational engineering, coping with complexity*. Springer. 2025. Pages: 293 ~ 298. ISBN: 9783031823336. https://link.springer.com/book/10.1007/978-3-031-82334-3.

2. Anich, N.; Mateo, M.; Balaguer, A.. **Distribution redesign of the supply chain in the car industry**. *Organizational engineering, coping with complexity*. Springer. 2025. Pages: 147 ~ 152. ISBN: 978-3-031-82333-6. https://link.springer.com/book/10.1007/978-3-031-82334-3.

3. Bautista, J.. **Análisis de la desproporcionalidad del reparto de poder entre territorios. Caso del Parlamento Europeo**. *2025 Retos vitales para una nueva era : horizontes de Europa: claves para el futuro*. Real Academia Europea de Doctores. Barcelona, 1914. 2025. Pages: 40 ~ 67. ISBN: 9788409700691. https://raed.academy/retos-vitales/.

4. Bautista, J.. **I. Evolución social en tiempos de cambio. Ejes de transformación: migración, geopolítica y estabilidad social. La representatividad política de la Unión Europea: Caso parlamento europeo**. *2025 retos vitales para una nueva era : horizontes de Europa. Claves para el futuro*. Real Academia Europea de Doctores. Barcelona, 1914. 2025. Pages: 41 ~ 68. ISBN: 9788409700691. https://raed.academy/retos-vitales-2025-horizontes-de-europa-claves-para-el-futuro/.

5. Bautista, J.. **Gestión de los residuos nucleares radiactivos procedentes de las centrales nucleares: estrategias para el manejo de residuos radiactivos**. *2024 Retos Vitales para una nueva era*. Real Academia Europea de Doctores. Barcelona, 1914. 2024. Pages: 61 ~ 85. ISBN: 978-84-09-62607-6. https://fundacionraed.org/retos-vitales/informe-2024/.

6. El Madafri, I.; Noelia Olmedo-Torre; Peña, M.. **Bridging the generalization gap in wildfire**. *Recerca al Departament d'Enginyeria Gràfica i de Disseny de la Universitat Politècnica de Catalunya. Barcelona Tech*. OmniaScience Monographs. 2025. Pages: 93 ~ 99. ISBN: 978-84-128130-8-1. https://www.omniascience.com/books/index.php/monographs/catalog/book/152 .

7. Matarrodona, P.; Baltà, R.; Peña, M.. **Reduint la bretxa de gènere en l'enginyeria a través d'imatges generades mitjançant intel·ligència artificial**. *Recerca al Departament d'Enginyeria Gràfica i de Disseny de la Universitat Politècnica de Catalunya. Barcelona Tech*. OmniaScience. 2025. Pages: 168 ~ 180. ISBN: 978-84-128130-8-1. https://www.omniascience.com/books/index.php/monographs/catalog/book/152 .

8. Porto, A.; Lusa, A.; Porto, R.; Henao, C.. **Optimizing retail staffing: multiskilling levels in personnel scheduling under uncertain demand**. *Organizational engineering, coping with complexity*. Springer. 2025. Pages: 171 ~ 177. ISBN: 9783031823343. https://link.springer.com/chapter/10.1007/978-3-031-82334-3_30.

9. Marzabal-Gatell, A.; Zaplana, I.. **Closed-form inverse kinematics solutions for a class of serial robots without spherical wrist using conformal geometric algebra**. *Advances in Mechanism Design IV: proceedings of TMM 2024*. Springer. 2024. Pages: 231 ~ 240. ISBN: 978-3-031-70251-8. https://link.springer.com/book/10.1007/978-3-031-70251-8.

10. Seminars

Title : **Knowledge Representation and Reasoning for Advanced Robotic Manipulation.** 25/03/25
Speaker : Oriol Ruiz Celada - Division of Robotics

Title: **Complex-valued sliding mode control of three-phase current source inverters.** 25/03/25
Speaker: Leila Rahimi - Division of Control

Title : **Ontology Population with LLMs.** 27/05/2025
Speaker : Víctor Molina - Divisió Robòtica.

Title: **Multi-objective optimization for food security.** 27/05/2025
Speaker: Pol Gil - Divisió de Disseny i optimització de processos i serveis

11. Awards and distinctions

1. Casanovas, À.; Pujol, M.; Zaplana, I.. **Eight Iberian Robotics Conference Edition of the Best Paper Award -- Best Paper ROBOT2025 Award**. 2025. *Treball "A modified Jacobian pseudo-inverse algorithm for finger inverse kinematics in anthropomorphic hands" presentat al congrés "Eight Iberian Robotics Conference - ROBOT2025"*. **First prize**. SIR-OPE - Service and Industrial Robotics - Operation, Production and Enterprise.

2. Casanovas-Rubio, M.; de la Fuente, A.; Pons-Valladares, O.; Armengou, J.; Viñolas, B.. **5è Premi UPC al Compromís Social. Canvia el món amb la UPC**. 2025. *Tecnologia per a l'empoderament de comunitats vulnerables: fàbriques sostenibles de plaques de terra-ciment per a l'habitatge digne*. **Other**. SMArT - Sustainabilty and Metabolism in Architecture and Technology; EC - Construction Engineering Group.

3. Garrell, A.; Zaplana, I.. **Sener's Bot Talent 2024**. 2024. *La Fundación Sener, organización sin ánimo de lucro de la compañía de ingeniería y tecnología Sener, ha celebrado este lunes 8 de julio, en su sede en Tres Cantos, la final del concurso de robótica aplicada a vehículos autónomos 'Sener's Bot Talent', dirigido a equipos universitarios formados por estudiantes de último curso y máster. El equipo ganador ha sido el de la Universitat Politècnica de Catalunya (UPC), el equipo 'Rovernetas', que se ha alzado con el Premio absoluto, dotado con 1.200 €. En el concurso también han participado los equipos de la Universidad Carlos III de Madrid (UC3M), Universidad Europea de Madrid (UEM) y Universidad Politécnica de Madrid (UPM).*. **First prize**. RAIG - Mobile Robotics and Artificial Intelligence Group; SIR-OPE - Service and Industrial Robotics - Operation, Production and Enterprise.

4. Juanpera, M.; Gil-Figuerola, P.; Koenen, M.F.; Kuri, S.; Damu, C.; Ferrer-Martí, L.. **XVIII International Conference on Industrial Engineering and Industrial Management - XXVIII Congreso de Ingenieria de Organización (CIO2024)**. 2024. *Optimising diets: quantitative methods for guiding transition towards healthy diets*. **First prize**. DOPS - Disseny i Optimització de Processos i Serveis.

5. Sheikhsamad, M.. **Learning-Based Control of Autonomous Vehicles Using an Adaptive Neuro-Fuzzy Inference System and the Linear Matrix Inequality Approach**. 2024. *The Editor's Choice Articles are selected by the Editors-in-Chief as noteworthy or likely to be of high interest to readers, and comprise key papers that highlight some of the best current research published in Sensors.*. **First prize**.

6. Shirzadi Maryan, M.; Zaplana, I.; Suarez, R.. **29th International Conference on Emerging Technologies and Factory Automation**. 2024. *Article del tipus Work-in-progress, que va estar reconegut com el millor de tots els articles de la mateixa categoria (al voltant de 100). L'article, que també apareixerà a les proceedings de la conferència, té el títol: Analytical approach to reorient unknown objects via in-hand manipulation, i els autors són: Morad Shirzadi, Isiah Zaplana i Raúl Suárez, tots de la UPC i de l'Institut d'Organització i Control de Sistemes Industrials (IOC-UPC).*. **First prize**. SIR-OPE - Service and Industrial Robotics - Operation, Production and Enterprise.

12. Extracurricular activities

Master executive in Lean Supply Chain Management. Direcció d'Operacions I Logística - Master's degree. Face-to-face.

Academic management: Rúa Costa, Carles; August Casanovas.

Presentation

16th year

Traditional functions in companies such as production, distribution, planning or logistics have evolved with the change in economic cycles. The productive function has adapted to the new needs of markets, incorporating new trends such as Lean Manufacturing¿ and embracing quality control, training or staff motivation as part of its tasks. Likewise, logistics have also changed, and the concept Integrated Logistics has come to comprise all the value chain between the customer and the supplier, as well as the flow of information and materials.

Integrated management of the distribution chain, production and supplies is now known as Supply Chain Management. The emergence of logistics has forced governments to work on improving and updating infrastructures roads, railway, ports and airports and this, together with staff training and research and innovation as key aspects to increase the level of competitiveness in the business fabric.

This Master's Degree aims to be unique and exclusive, a reference point for all professionals aiming to develop their career in the areas of logistics, distribution, supplies and, in general, Year aspect relating to the supply chain management and design. To make this possible, the course has included prestigious professionals from the main European universities (CRANFIELD) and leading schools in specific areas (European Short Sea Shipping School). For this Masters we also have the collaboration of managers from the leading logistics companies in Spain, who will transmit their experiences to the students.

AIMS

- TO PUT INTO QUESTION, THE CURRENT ORGANISATIONAL AND MANAGEMENT SYSTEMS IN THE LOGISTICS CHAIN.
- TO STRATEGICALLY ANALYSE, ORIENT AND DEFINE THE ENTIRE LOGISTICS CHAIN AND ALL OF ITS DIFFERENT SECTORS, IMPLEMENTING AND ADAPTING NEW TECHNOLOGIES TO BOOST COMPANIES LOGISTICS SERVICES.
- TO DESIGN AND IMPLEMENT NEW SYSTEMS AND METHODOLOGIES TO IMPROVE THE MANAGEMENT OF THE RELATIONSHIPS AMONG PROVIDERS, BUSINESSES, OPERATORS AND END CLIENTS.
- TO EFFECTIVELY MANAGE PERSONNEL TEAMS THAT NEED TO COLLABORATE WITH THE CULTURAL CHANGE IMPLIED IN IMPLANTING AN INTEGRATED STRATEGY OF SUPPLY CHAIN MANAGEMENT

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