DCE 25 6th DOCTORAL CONGRESS IN ENGINEERING

# Book of Abstracts

of DCE25

## Symposium on Transport Systems and Mobility

**Editors:**
Joana Hora, Jorge Pinho de Sousa,
Juliana Carvalho, Sérgio Pedro Duarte.

Porto
June 2025

# Symposium on Transport Systems and Mobility

This volume contains the peer-reviewed and accepted abstracts presented at the Symposium on Transport Systems and Mobility of the 6th Doctoral Congress in Engineering – DCE25, held at the Faculty of Engineering of the University of Porto (FEUP), between June 30th and 1st July, 2025.

**Title:** Book of Abstracts of DCE25 Symposium on Transport Systems and Mobility

**Edited by** Joana Hora, Jorge Pinho de Sousa, Juliana Carvalho, Sérgio Pedro Duarte

**Published by:** FEUP Edições

Digital version Symposium on Transport Systems and Mobility – DCE 2025 (https://fe.up.pt/dce/2025/symposia/symposium-on-transport-systems-and-mobility/)

First edition June 2025

**ISBN:** 978-972-752-348-1

# WELCOME

## Message from the Organizing Committee

We warmly welcome all participants to the Symposium on Transport Systems and Mobility (STSM), held in the scope of the 6th Doctoral Congress in Engineering (DCE25), hosted at the Faculty of Engineering of the University of Porto (FEUP), Portugal.

This Symposium is organized by PhD students or young PhD holders of the Doctoral Program in Transport Systems (PDST) at FEUP. This year's meeting, with 18 oral presentations, covers topics such as urban mobility and public transport, city and multimodal logistics, or transport safety.

The symposium will be an opportunity for informal networking of the participants, and in particular of young researchers and doctoral students. Master students may also enjoy participating and therefore discover this fascinating interdisciplinary area of research and professional activity.

Transport systems and mobility are, in fact, having an enormous growth and are an important part of everybody's lives. But they are also a field for a large and broad range of activities, from applied research to the development of new business models and start-ups.

The presence of peers, faculty members and industrial partners will surely create the right environment for debating some relevant current topics of research and for surveying the main trends in this area. The challenges are immense, but we will all be ready to face them by developing high quality research, together with companies, authorities and operators, to help solve some of the biggest societal problems of today.

We are truly grateful to our invited speakers for having accepted our invitation and sharing their expertise, thereby enhancing the quality and impact of the Symposium. And we would like to express our sincere appreciation to all authors for their valuable contributions, as well as to the Symposium Organizing Committee, the Scientific Committee, and all participating institutions for their invaluable support..

Porto, June 2025

The Symposium Organizing Committee

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# VENUE

**Faculty of Engineering of the University of Porto (FEUP)**

**Address:** Rua Dr. Roberto Frias, s/n 4200-465 Porto | Portugal

**Coordinates:** 41.1780, -8.5980 (41° 10' 40.8'' N, 8° 35' 52.8'' W)

**Website:** www.fe.up.pt

The city of **Porto**, known as "Cidade Invicta" (the invincible city), is the second largest city of **Portugal**, the capital of the Porto district and the northern region. Porto is built along hillsides overlooking the mouth of the Douro River, and it is an outstanding urban landscape with a 2,000-year history.

Porto's continuous growth is related to the sea (the Romans gave it the name Portus, or port). It was declared a World Heritage Site by UNESCO in 1996 and considered the European Best Destination in 2014 and 2017.

Explore Porto's charming streets, historic landmarks such as the Sé Cathedral, Clérigos Tower and Dom Luís I Bridge, and savor local culinary favorites like the "Francesinha" (a must-try hearty sandwich for any visitor), "bacalhau" dishes (cod fish), and "pastel de nata" (creamy custard tart with a crisp, flaky crust).

Across the Douro River lies Vila Nova de Gaia, famed for its port wine cellars and stunning views of Porto's skyline. Visit the cellars to discover the region's rich winemaking heritage and the history of port wine production, from the historic lodges to the modern tasting rooms.

Don't miss the opportunity to witness the stunning sunset from Jardim do Morro or visit the Serra do Pilar, a UNESCO World Heritage Site offering panoramic views of Porto and the Douro River.

Together, Porto and Vila Nova de Gaia offer a unique mix of culture, history, and gastronomy. For details on accommodation, public transport, sightseeing tours, gastronomy, nightlife and culture may be found in the Official Portal of Porto Tourism and Visit Porto and the North Portal.

# PROGRAMME

## Monday, June 30th, 2025

| | |
|---|---|
| **07h20 – 08h20**<br>*Lobby* | **REGISTRATION** |
| | ***DCE 25 General Program*** |
| **08h20 – 08h45**<br>*Main Auditorium** | **OPENING CEREMONY**<br>**Jaime Cardoso**, *President of the DCE25 Scientific Committee, Vice-President of FEUP's Scientific Council, Head of Research Area and Doctoral Affairs*, FEUP<br>**Vítor Vilar**, *DCE25 Chair, Principal Researcher*, LSRE-LCM/ALiCE, FEUP |
| **08h45 – 09h10**<br>*Main Auditorium** | **KEYNOTE LECTURE**<br>*Chair:* **Rita Lado**, *DCE25 Co-Chair, Principal Researcher*, LSRE-LCM/ALiCE, FEUP<br>*Author Workshop: A Whistlestop Tour of Common Ethical Pitfalls of Well-Intentioned Researchers*<br>**Kay Tancork**, *Executive Publisher, Chemical Engineering*, Elsevier |
| **09h10 – 10h00**<br>*Main Auditorium** | **LIFE AFTER A PhD: WHAT CAN YOU DO?**<br>*Chairs:* **Tânia Lopes**, *DCE25 Co-Chair, Assistant Researcher*, LEPABE/ALiCE, FEUP<br>**Jaime Cardoso**, *Vice President of FEUP Scientific Council*, FEUP |
| 09h10 – 09h35 | *Carrer Horizons for Early-Stage Researchers*<br>**Bruno Béu**, *Advisor to FCT's Board of Directors*, FCT<br>**Rui Munhá**, *Science Officer*, FCT |
| 09h35 – 10h00 | *CoLABs and CTIs: A Catalyst for Doctorates and the Innovation Ecosystem*<br>**João Lobo Ferreira**, *Head of Interface Mission*, ANI |
| **10h00 – 10h30**<br>*B Corridor* | **COFFEE BREAK & POSTER SESSION & EXHIBITION** |
| **10h30 – 12h20**<br>*Main Auditorium** | **ROUND TABLE WITH CoLABs, CTIs AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE**<br>*Chairs:* **João Lobo Ferreira**, *Head of Interface Mission*, ANI<br>**Adélio Mendes**, *Full Professor*, FEUP<br>**Pedro Ávila**, *Director of Operational Sustainability*, REN<br>**Luís Seca**, *Director*, AAET (Association Alliance for the Energy Transition) |

## Monday, June 30th, 2025

| | |
|---|---|
| | **Marco Ferraz**, *Head of Upstream and Industrial Innovation Center*, Galp<br>**Joana Maria**, *Executive Director*, Vortex-CoLAB<br>**Simão P. Cardoso**, *Product Manager*, Paralab Engineering<br>**Jaime Gabriel Silva**, *Head of innovation area*, Águas do Douro e Paiva S.A. and SimDouro S.A. (both AdP Group), and *Invited Teacher*, ISEP<br>**Luís Filipe Santos**, *Product Prescription and Technical Support*, FIBRAN<br>**Ricardo Rato**, *Executive Director*, HyLab<br>**Luís Tiago Ferreira**, *Responsible for the Smart Cities, Public Lighting, and Open Data*, E-Redes<br>**Mónica Read**, *Projects and Works Engineer*, Águas e Energia do Porto<br>**Joana Monte**, *R&D and Innovation Senior Consultant*, KPMG<br>**Luís Seca**, *Member of the Executive Board*, INESC TEC |
| **12h20 – 12h30**<br>*FEUP Central Garden* | **DCE25 OFFICIAL PHOTO** |
| **12h30 – 14h00**<br>*FEUP Central Garden* | **LUNCH BREAK** |
| **14h00 – 15h20** | **WORKSHOPS** |
| 14h00 – 14h35 (1st Session)<br>14h45 – 15h20 (2nd Session)<br>*Auditorium B001* | *Workshop 1 – "Depression and anxiety in PhD students: Preventing emotional exhaustion and burnout"*<br>**Fernanda Mendes**, *FEUPs GOI-Orientation and Integration Unit*<br>**Helena Lopes**, *FEUPs GOI-Orientation and Integration Unit* |
| 14h00 – 14h35 (1st Session)<br>14h45 – 15h20 (2nd Session)<br>*Auditorium B002* | *Workshop 2 – "My career with a PhD: to open up or close a gap?"*<br>**João Henrique Almeida**, *FEUP Talent Unit* |
| 14h00 – 14h35<br>*Auditorium B003* | *Workshop 3 – "La Caixa: Funding Opportunities?"*<br>**Gisela Coromines i Calders**, *Doctoral Fellowships Programme Manager*, Fundació "la Caixa"<br>**Inês Claro**, *Doctoral INPhINIT Fellow*, Fundació "la Caixa" |
| 14h45 – 15h20<br>*Auditorium B003* | *Workshop 4 – "The ERC and the ERC-Portugal Programme: How Preparation Meets Opportunity"*<br>**Bruno Béu**, *Advisor to FCT's Board of Directors*, FCT<br>**Rui Munhá**, *Science Officer*, FCT |

## Monday, June 30th, 2025

### *Symposium on Transport Systems and Mobility*

**15h30 – 16h30**
*Auditorium B012*

***WELCOME SESSION***

**Jorge Pinho de Sousa**, *Chair of the Symposium on Transport Systems and Mobility*, Full Professor, FEUP
**Teresa Galvão Dias,** *Director of the Doctoral Program in Transport Systems*, Associate Professor, FEUP

***SESSION I: URBAN MOBILITY AND PUBLIC TRANSPORT***

*Chairs:* **Marta Campos Ferreira,** *Assistant Professor, FEUP*
**Joana Hora,** *Researcher*, FEUP

**15h30 – 15h50**

**KEYNOTE LECTURE**

*Revolutionize mobility in the Porto Metropolitan Area: enhance public transport*
**Marco Martins,** *Presidente do Conselho de Administração, TMP — Transportes Metropolitanos do Porto*

**15h50 – 16h30**

**ORAL COMMUNICATIONS**

**OC8.** *Segmenting the Intermodal PT Traveler: A Psychometric and Behavioural Study in Porto Metropolitan Area*
**João Filipe Teixeira**, *Researcher, FEUP*

**OC14.** *Equity and Efficiency Perspectives in Public Transport Design*
**Mudassar Shafiq,** *Researcher,* FEUP

**OC11.** *Qualitative decision-support approaches for sustainable urban mobility planning: insights from metropolitan case studies*
**Juliana Carvalho**, *PhD Student,* FEUP

**16h30 – 17h00**
*B Corridor*

**COFFEE BREAK & EXHIBITION**

**17h00 – 18h30**
*Auditorium B012*

***SESSION II: LOGISTICS***

*Chairs:* **Jorge Pinho de Sousa**, *Full Professor*, FEUP
**Catarina Marques**, *Researcher*, INESC TEC

**17h00 – 17h40**

**KEYNOTE LECTURES**

*Sustainable Mobility - Maritime Transport, Ports, and Intermodality*
**Hugo Lopes**, *Director of the Department of Development and Sustainability*, APDL — Administração dos Portos do Douro, Leixões e Viana do Castelo

*Tackling decarbonization, from H2Driven to a more sustainable society*
**João Filipe Jesus**, Head of Corporate & Project Finance, Dourogás Renovável

## Monday, June 30th, 2025

| | |
|---|---|
| **17h40 – 18h30** | **ORAL COMMUNICATIONS** |
| | **OC5.** *Resilience and Flexibility of Transport Systems in Tourism Management Companies: Strategies to Address Uncertainty and Risk*<br>**Carmen Santos Lima**, *PhD Student,* FEUP |
| | **OC6.** *Improving Port Performance through Synchronised Operations: A Modular Decision Support System*<br>**Catarina C. Carvalho**, *PhD Student,* FEUP |
| | **OC10.** *Optimizing Truck Scheduling at Container Terminals: a Heuristic-Based Approach*<br>**José L. Moreira**, *MSc Student,* FEUP |
| | **OC1.** *Collaborative logistics and heuristic optimization for sustainable last-mile urban distribution*<br>**Alisson Garcia-Herrera**, *PhD Student,* Public University of Navarre |
| | **OC18.** *The Critical Factors for Collaboration in Last-Mile Logistics*<br>**Vasco Silva,** *PhD Student,* FEUP |
| **18h30 – 19h30**<br>*FEUP Central Garden* | **SOCIAL EVENT**<br>**WELCOME DRINK (TUNAFE & TEUP)** |

## Tuesday, July 1st, 2025

**08h00 – 09h00** — **REGISTRATION**
*Lobby*

### *Symposium on Transport Systems and Mobility*

**09h00 – 10h30**
*Auditorium B012*

***SESSION III: SAFETY***
**ORAL COMMUNICATIONS**
*Chairs:* **António Lobo**, *Researcher, FEUP*
**Sérgio Pedro Duarte**, *Invited Assistant Professor, FEUP*

**OC15.** *Planning road infrastructure interventions using crash prediction models*
**Pedro Rodrigues**, *PhD Student,* FEUP

**OC4.** *Influence of Weather Conditions on Railway Accident Occurrence in Portugal*
**Belzénia Matsimbe**, *PhD Student,* FEUP

**OC9.** *Evaluating Systematic Literature Reviews by DSAIVE - Dynamic Systematic Artificial Intelligence Vector Engine*
**João Pinto Oliveira,** *PhD Student,* FEUP

**OC7.** *Real-Time Detection of Driver Fatigue Using Mobile Device Sensors and Artificial Intelligence On-Device*
**Gonçalo Almeida**, *MSc Student,* FEUP

**OC17.** *Reconciling safety, energy efficiency and operations towards the integration of truck platooning in the freight transport ecosystem*
**Telmo Costa Botelho,** *PhD Student,* FEUP

**10h30 – 11h00** — **COFFEE BREAK & EXHIBITION**
*B Corridor*

**11h00 - 12h30**
*Auditorium B012*

***SESSION IV: URBAN MOBILITY AND PUBLIC TRANSPORT***
*Chairs:* **Jorge Freire de Sousa**, *Associate Professor*, FEUP
**Juliana Carvalho**, *PhD Student*, FEUP

**11h00 – 11h20** — **KEYNOTE LECTURE**

*Public transit systems planning and scheduling – problems and methodologies*
**Bruno Oliveira**, *Researcher, OPT — Otimização e Planeamento de Transportes*

**11h20 – 12h30** — **ORAL COMMUNICATIONS**

**OC13.** *Synchronization Applications in Public Transport Timetabling: Insights from a Systematic Literature Review*
**Luísa Bastos Leite**, *MSc Student,* FEUP

**OC12.** *A Conceptual Framework to Guide Horizontal Collaborative Initiatives in Logistics*
**Leandro Carvalho,** *PhD Student,* FEUP

## Tuesday, July 1st, 2025

| | |
|---|---|
| | **OC3.** *Understanding Urban Mobility Patterns - Analysis of Porto's Mobility Survey*<br>**Beatriz Cavaleiro**, *MSc Student,* FEUP<br><br>**OC16.** *Explainable Blackboard Architecture for User-Centered Route Recommendations in Active Mobility*<br>**Soraia Felício**, *PhD Student,* FEUP<br><br>**OC2.** *Mobility in low-density areas: a framework for designing Demand Responsive Transports*<br>**Armando Dauer**, *PhD Student,* FEUP<br><br>**CLOSING SESSION**<br>**António Couto,** *Chair of the Symposium on Transport Systems and Mobility-DCE25, Full Professor*, FEUP |
| **12h30 – 14h00**<br>*FEUP Central Garden* | **LUNCH BREAK** |

| DCE 25 General Program | |
|---|---|
| **14h00 – 14h20**<br>*Main Auditorium** | **SCIENCE COMMUNICATION**<br>*Chair:* **António Coelho**, *Associate Professor*, DEI/FEUP |
| 14h00 – 14h05 | *Hackathon Program*<br>**António Coelho,** *Associate Professor*, DEI/FEUP<br>***Five-Minute Pitch for 3 teams of PhD Students*** |
| 14h05 – 14h10 | **Team 1 –** *Dino e a Cadeia da Vida*<br>**Ana Camarinha**, Idea and Sketching<br>**Jorge Ferreira**, Game Development<br>**Raushan Mukhamejanova**, Idea and Sketching<br>**Rosana Oliveira**, Narrative |
| 14h10 – 14h15 | **Team 2 –** *Time Travelers*<br>**Ana Cristina,** Organization and Creation<br>**Bárbara Bender**, Organization and Creation<br>**Diana Sousa**, Website and App<br>**Jadna da Cruz**, Website, App, Gps, and Image Recognition<br>**Miguel Guimarães**, Website, App, Gps, and Image Recognition |
| 14h15 – 14h20 | **Team 3 –** *God Save the Carbon*<br>**Elizaveta Osipovskaya**, Storytelling Wizard<br>**Fernando Osório**, Calculations<br>**Mariam Conceição**, Sparkler<br>**Priscila Reinaldo**, PR Developer<br>**Sebastião Ventura**, Researcher<br>**Safa Vakili**, UI Magician |
| **14h20 – 15h40**<br>*Main Auditorium** | **VENTURE SCIENTISTS**<br>*Chair*: **Liliana Antão**, *PhD Student (PRODEI)*, FEUP |
| 14h20 – 14h30 | *What is Conception X?*<br>**Carrie Baptist**, *Chief Strategy Officer*, ConceptionX |
| 14h30 – 14h35 | *FTNanoAD-Targeted-Nanocarriers for Brain Diseases*<br>**Joana Loureiro**, *Assistant Professor*, FEUP |
| 14h35 – 14h45 | *School of Startups at UPTEC*<br>**Raphael Stanzani,** *Entrepreneurship Programs Manager*, UPTEC |
| 14h45 – 14h55 | *A Success Case of a Spin-Off FEUP: AddVolt*<br>**Bruno Azevedo,** *CEO*, AddVolt |
| **14h55 – 14h40** | ***Five-Minute Pitch for PhD Students***<br>*LogloTrix, Smart Inventory Management*<br>**Amir Hossein Farzamiyan**, *PhD Student, Doctoral Program in Telecommunications*, FEUP<br>*FertiGo – Wastewater in. Fertilizer out.*<br>**Luiza Sena**, *PhD Student, Doctoral Program in Environmental Engineering*, FEUP<br>*EcoWires – Plastic-free smart packaging* |

| | |
|---|---|
| | **Rita Martins**, *PhD Student, Doctoral Program in Chemical and Biological Engineering*, FEUP<br>**Inês Freitas**, *PhD Student, Doctoral Program in Chemical and Biological Engineering*, FEUP<br><br>*MyKneeRecovery – Precision Monitoring for Better Rehabilitation*<br>**Joana Cerqueira**, *PhD Student, Doctoral Program in Biomedical Engineering*, FEUP<br><br>*UPWIND – Portable, Clean and Affordable Electrical Energy for All*<br>**Manuel Fernandes**, *PhD Student, Doctoral Program in Electrical and Computer Engineering*, FEUP<br><br>*BodyBoost – Stop Injuries Before They Stop You*<br>**Ana Teixeira**, *PhD Student, Doctoral Program in Informatics Engineering*, FEUP<br><br>*Triple-Action Cutaneous Device for Skin Cancer Treatment*<br>**Rita Barros**, *PhD Student, Doctoral Program in Chemical and Biological Engineering*, FEUP |
| **15h40 – 16h10**<br>*FEUP Central Garden* | **COFFEE BREAK & POSTER SESSION & EXHIBITION** |
| **16h10 - 17h00**<br>*Main Auditorium** | **PLENARY LECTURE**<br>*Chair*: **Miguel Madeira**, *Full Professor*, LEPABE/ALiCE, FEUP<br><br>*Leadership at the Intersection of Academia, Policy, and Development: Bridging Knowledge to Impact Society*<br>**Margarida Mano,** *Vice-Rector*, Universidade Católica Portuguesa (Former Minister of Education and Science, Portugal, 2015) |
| **17h00 - 17h30**<br>*Main Auditorium** | **AWARDS**<br>*Chairs:* **Jaime Cardoso**, *Vice-Dean for Research and Doctoral Affairs*, FEUP<br>**Francisco Vasques**, *Coordinator of FEUP's Special Project to Upgrade Doctoral Education*, FEUP<br><br>*Best Oral and Poster Communication (Per Symposium)*<br>*Science Communication*<br>*Venture Scientists*<br>*Sponsors* |
| **17h30 - 18h00**<br>*Main Auditorium** | **CLOSING CEREMONY**<br>*Chair:* **Jaime Cardoso**, *Vice-Dean for Research and Doctoral Affairs*, FEUP<br><br>**Ana Maria Camanho**, *Vice-Rector*, University of Porto<br>**Rui Calçada**, *Dean*, FEUP |
| **18h00 – 21h00**<br>*FEUP Central Garden* | **SOCIAL EVENT**<br>**SUNSET** |

**Main Auditorium: Auditorium Prof. Dr. José Marques dos Santos*

# INVITED SPEAKERS

## DCE25 General Programme

**KEYNOTE LECTURE**

**Kay Tancock**
*Executive Publisher, Chemical Engi*neering, Elsevier

***Author Workshop: A Whistlestop Tour of Common Ethical Pitfalls of Well-Intentioned Researchers***

The talk will walk the audience through the 'Top 10 Ethics Pitfalls of Well-Intentioned Researchers'. We will consider a number of typical items that honest researchers often get wrong, and how you can avoid them. The session looks beyond plagiarism and other intentional breaches in publishing ethics and examines some of the key pitfalls you may not have considered. The aim is to assist new authors by making their publishing journey as straightforward as possible and helping them to submit articles that will appeal to journal editors and reviewers. Join us for a half-hour countdown of everything you must *not* do if you want to get published!

**Biography**

**Kay Tancock** is the Executive Publisher overseeing a prestigious portfolio of Chemical and Environmental Engineering journals at Elsevier, including the *Journal of Environmental Chemical Engineering*, *Chemical Engineering Journal*, and *Chemical Engineering Science*. With 12 years of experience at Elsevier, she has managed journals across diverse subject areas, from geography to control engineering. Based in the UK office in Oxford, Kay is dedicated to supporting early career researchers and will be available at DCE25 to engage with attendees about their publishing aspirations. Her presentation will focus on essential best practices for ethically sound publishing, and she welcomes further discussions on all publishing and journal-related topics during the conference. Attendees are more than welcome to plan conversations with Kay regarding their research publication plans.

## LIFE AFTER A PHD: WHAT CAN YOU DO?

**Bruno Béu**
*Advisor to FCT's Board of Directors,* FCT

**Rui Munhá**
*Science Officer,* FCT

***Career Horizons for Early-Stage Researchers***

Fostering high-quality research careers and broadening the diversity of career pathways – including through integrated approaches to collaborative, disciplinary, geographical and intersectoral mobilities – are key priorities for strengthening the competitiveness of research systems. Public policy has a critical role in shaping more inclusive, collaborative, and internationalised research ecosystems, and FCT has been translating these objectives into new and innovative approaches, in view of establishing an effective continuum between national and European frameworks. The relevance of career planning, investment in networking, or horizontal skills development and other capacity building initiatives, gains new momentum with the ongoing transformation of how research is assessed and the transition to a new paradigm of evaluation models. This presentation explores the present and future national, European and international funding schemes with particular emphasis on structured career planning and progression, mobility, and cross-sectoral collaboration. It also highlights models that support talent circulation, engagement with non-academic sectors, and institutional capacity-building to attract and retain researchers.

**Biography**

**Bruno Béu** holds a PhD in Philosophy from the University of Lisbon. His academic work focused on philosophy of language, literature, aesthetics and linguistics, and he has taught in several of these fields at the School of Arts and Humanities of the University of Lisbon. He was the principal investigator of an interdisciplinary research line in comparative studies, developed in collaboration with national institutions, and is the author or editor of two books and numerous articles and book chapters.

He has held various roles in science and research policy, including senior scientific officer for the Humanities and Social Sciences at the Evaluation Office of the Fundação para a Ciência e a Tecnologia (FCT), advisor to the Lisbon City Council in the field of education, and executive coordinator of the academic open access publishing house Imprensa de História Contemporânea.

He currently serves as advisor to the FCT Board of Directors in the areas of strategy and evaluation and is director of the ERC-Portugal programme. He is the national delegate to the ERC Programme Committee and to the OECD's Committee for Scientific and Technological Policy (CSTP), and the designated focal point for the Portuguese delegation to all OECD bodies in the field of STI. He also co-chairs the Portuguese National Chapter of the Coalition for Advancing Research Assessment (CNP-CoARA).

## LIFE AFTER A PHD: WHAT CAN YOU DO?

**Rui Munhá** has been a Science Officer in the Department of International Relations of the Portuguese Foundation for Science and Technology (FCT) since 2014. He is currently Co-Coordinator of the National Contact Points of the European Programme for Research and Innovation Horizon Europe, and he also represents FCT and Portugal in different governing bodies in the context of the European Union or International Organisations. Rui Munhá obtained a PhD in Chemistry in 2011, and he developed his scientific activity at the University of Lisbon, University of British Columbia (Vancouver, Canada), University of California (Irvine, USA) and the University of Aveiro. Rui was born in Lisbon, in 1979.

**João Lobo Ferreira**

*Head of Interface Mission,* ANI

***CoLABs and CTIs: A Catalyst for Doctorates and the Innovation Ecosystem***

Collaborative Laboratories (CoLABs) and Centers for Technology and Innovation (CTIs) play a critical role in advancing doctoral research and fostering innovation. By bridging academia and industry, these institutions provide doctoral students with practical research opportunities, access to state-of-the-art infrastructures, and collaborative networks that drive knowledge transfer and economic growth. This presentation explores their impact, challenges, and future potential in the innovation ecosystem.

**Biography**

**João Lobo Ferreira** has been part of ANI since 2007. Since 2023, he has led the Interface Mission sub-unit, which focuses on supporting institutions that bridge academia and companies. Throughout his career, he has played a key role in monitoring the implementation of public policy measures to support R&D, business innovation, and capacity building of interface institutions. He holds a degree in Economics.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***REN's challenges of Energy Transition and Climate Change***

REN – Redes Energéticas Nacionais is an exclusive TSO (Transmission System Operator) in Electricity and Gas Systems and 2sd largest gas DSO in Portugal, with 70-year track record as a leading energy infrastructure operator, with international presence. REN acts in accordance with the energy goals of the European Union and Portugal, helping the planet combat climate change to enable energy transition, without forgetting the security and quality of energy supply, the digitalization and innovation, and integrating new renewable capacity such as wind, solar and renewable gases. REN have a significant investment plan for 2024-27 1,5-1.7 B€ investment.

REN Award, specifically in the context of academia, is indeed one of the oldest scientific awards in Portugal. It was established in 1995 to recognize and encourage excellence in energy-related research among Master's and Doctoral theses in Portuguese higher education. REN will continue to foster internal people excellence, attract and retain talent.

**Biography**

**Pedro Ávila**
*Director of Operational Sustainability,* REN

**Pedro Ávila** is a seasoned executive with extensive experience in the energy sector, having worked at the three largest energy companies in Portugal. He currently serves as Director of Operational Sustainability at REN. With a degree in Mechanical Engineering, has strengthened his academic background with top-tier executive education, including an MBA from Porto Business School and the Advanced Management Program at AESE.

Throughout his career, he has led multiple national and international projects in both the gas and electricity sectors, consistently demonstrating strong expertise in project and operations management across various markets. His work is marked by a deep commitment to environmental responsibility and the mitigation of environmental impacts.

Beyond his professional life, Pedro is passionate about travel, music, design, and contemporary art. He strives to be an innovative leader, dedicated to team development and building a more sustainable future.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***Bridging knowledge and innovation: The role of the Alliance for the Energy Transition (ATE) Agenda in connecting industry, SMEs, and academia***

This presentation explores the ATE Agenda's role in bridging industry, SMEs, and academia to accelerate the shift to sustainable energy. It focuses on how integrating highly qualified resources enhances innovation, research, knowledge transfer and the development of cutting-edge solutions. The presentation also addresses AAET's role in sustaining these partnerships after ATE funding.

**Luís Seca**

*Director,* AAET (Association Alliance for the Energy Transition)

**Biography**

**Luís Seca** is a senior researcher at the Centre for Power and Energy and member of the Board of Directors of INESC TEC. His research areas are distributed electrical resources integration (renewable based electricity generation, electric vehicles, storage, etc.) in distribution and transmission grids, dynamic analysis of electrical systems, smart grids and energy efficiency. Luís is also one of the Directors of AATE, an Association created to support the coordination, management and communication activities of the ATE Agenda, maximizing the value delivered and ensuring the success of ATE projects. AATE also aims to lay the foundations for an energy cluster, through a dynamic and competitive ecosystem for the energy transition.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***Bridging Science and Industry: Leading Upstream and Industrial Innovation at Galp***

Galp's Upstream and Industrial Innovation Center focuses on developing new solutions to enhance Galp's core business, aiming to reduce carbon intensity in exploration and production activities. The center leverages advanced technologies to optimize operations and asset value, while also supporting the decarbonization of Galp's industrial assets by promoting low-carbon technologies. Collaboration with startups, academia, and technology partners ensures a market-oriented approach to innovation. Specific projects include the development of inspection tools for operations at depths greater than 2000 meters, intelligent well completion technologies, and advancements in low-carbon fuels, carbon capture, and carbon utilization.

**Marco Ferraz**
*Head of Upstream and Industrial Innovation Center,* Galp

**Biography**

After starting his career as a researcher in Portugal, **Marco Ferraz** moved to San Francisco to work as a visiting researcher at the USGS, in collaboration with NASA. In 2009, he relocated to Australia to pursue a PhD at the University of Sydney, where he also served as a lecturer at the School of Geosciences. Upon returning to Portugal in 2012, Marco joined Galp as a Geoscientist in Exploration and Production, contributing to some of the company's most prominent assets. Today, he leads the Upstream & Industrial Innovation Center at Galp, managing over 60 research, development, and innovation projects in Portugal and Brazil. These initiatives span oil and gas production, refining processes, and energy transition topics such as hydrogen, low-carbon fuels, carbon capture, utilization and storage (CCUS), and energy storage. Marco is also chairman of the board of the Net4CO2 collaborative laboratory and board member of Bioref.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***VORTEX-CoLAB: Turning Research into Impact***

VORTEX-CoLAB bridges the gap between scientific research and real-world technology, focusing on cybersecurity, safety, and embedded systems — the core enablers of connected, autonomous technologies that shape how we live, move, and communicate. We bring together researchers, engineers, and industry partners to co-develop fast, practical solutions. Our projects combine applied research with hands-on prototyping, ensuring bold ideas are translated into tools companies can use. Students and PhD researchers are central to our work — not just observing, but contributing through thesis work, training, and active development. Through our affiliate program, companies gain early access to emerging technologies and help shape our innovation agenda. This model reduces risk, accelerates deployment, and keeps our work aligned with real-world needs. By advancing high-impact technologies, VORTEX is helping position Portugal as a relevant player in strategic sectors such as defense, semiconductors, and smart mobility — within Europe and beyond.

**Joana Maria**

*Executive Director,* Vortex-CoLAB

**Biography**

**Joana Maria** is Executive Director of VORTEX-CoLAB, a nonprofit collaborative laboratory focused on applied research in AI, cybersecurity, and embedded systems. With a PhD in Materials Science and Engineering from the University of Illinois at Urbana-Champaign, she brings over 20 years of experience across academia and industry, leading a team of nearly 40+ researchers and engineers developing safety and security solutions for next-generation cyber-physical systems in sectors such as mobility, aerospace, and critical infrastructure. Her career includes over a decade at IBM Research, where she co-founded the AI4Good Fellowship Program and led research initiatives spanning from fundamental science to commercial applications, including breakthrough work that contributed to the development of the world's first AI-designed fragrance. She holds 10 issued patents and has authored 27 peer-reviewed publications. A strong advocate for applied research with societal impact, she brings a systems-level perspective to building innovation ecosystems that connect science, industry, and policy.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***From Research to Innovation: Paralab Engineering as a Bridge Between Academia and Industry***

Paralab Engineering has established itself as the partner of excellence in the development of customized, scalable and high-performance equipment. Over the last three decades, it has maintained a close and continuous collaboration with all research units, supporting researchers in the development of tailor-made solutions, from laboratory prototypes to semi-industrial equipment. This close link to research means not only the creation of technology adapted to the real needs of the academic and scientific world, but also success stories where the paths of the client and the company merge – as in the case of a researcher who, after completing his doctorate, joined the Paralab Engineering team.

**Simão P. Cardoso**
*Product Manager,* Paralab

**Biography**

**Simão P. Cardoso** holds an Integrated Master's Degree in Chemical Engineering (MIEQ) from FEUP (2005-2010) and a PhD in Chemical Engineering (Branch in Chemical Products and Processes Engineering) from the University of Aveiro. Since February 2021, he has been product manager at Paralab, a company that distributes scientific equipment for laboratory and industrial applications and is responsible for several international brands in this field in the North of Portugal.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***Águas do Douro e Paiva (AdDP) – a commitment to innovation, knowledge and transformative solutions***

AdDP is the utility responsible for the bulk drinking water system that supplies 20 municipalities in the Porto region. The company foresees that present and future challenges require collaborative, innovative, and creative responses, which must also be anchored in knowledge. Having been created in 1995 – and celebrating its 30th anniversary – AdDP is a place of continuous evolution, where water continues to be an engine of progress, equity, and hope for future generations.

**Jaime Gabriel Silva**

*Head of innovation area, Águas do Douro e Paiva S.A. and SimDouro S.A. (both AdP Group), Invited Teacher,* ISEP

**Biography**

Born in Porto (1963). Civil engineer (FEUP / 1986); MSc (FEUP / 1997); currently, FEUP PhD student (PRODEC), in Asset Management field. He joined AdDP in 1998, where he was Engineering Director between 2000 and 2009, when he started management functions in the board of different Águas de Portugal Group companies, namely: Simlis (Leiria), Águas do Mondego (Coimbra), Simria (Aveiro), Águas do Centro Litoral (aggregated company of the former three) and Águas de Santo André. In 2020, he returned to AdDP, coordinating the innovation area for AdDP and SimDouro, as well as leading some enterprise projects. Before 1998, he worked at Fase (1991-98), at CICCOPN Laboratory (1991), at IBM (1989-90) and at Com. Coord. Região Norte (1987-89). Invited teacher at ISEP, since 1990.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***FIBRAN – What we do, challenges we face, and proximity with the academia***

FIBRAN is a leading manufacturer of XPS insulation panels. In addition to standard products, we offer a wide range of custom shapes and tailor-made solutions to meet specific project needs. Our products are well-established in the construction industry, although some technical challenges remain due to the material's intrinsic characteristics. To address these, FIBRAN is actively collaborating with academic institutions to further study and improve its performance, while continuing to deliver effective solutions for specialized applications.

**Luís Filipe Santos**
*Product Prescription and Technical Support,* FIBRAN

**Biography**

**Luís** graduated in Civil Engineering from FEUP in 2013. He began his career as an Assistant Project Manager on construction sites, contributing to the development of a new school and the renovation of a luxury hotel. He then joined a furniture manufacturer, where he managed FF&E assembly teams in Belgium and Luxembourg. Within the same company, he later oversaw proposal management, coordinating with both technical and commercial departments. Moving on, he took on the role of supporting project prescribers—mainly architects—providing technical guidance throughout the design process. Currently at FIBRAN, Luís plays a key role in technical support for prescribers, closely aligned with marketing and production, contributing to the development of new products for new challenges.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE


***HyLab - Green Hydrogen Collaborative Laboratory***

Presentation will introduce HyLab – the Collaborative Laboratory for Green Hydrogen – and its role in accelerating the development of innovative, science-based solutions for decarbonization. With a strong link between research and industry, HyLab contributes to the energy transition through applied R&D, technology integration, and support for industrial implementation.

**Ricardo Rato**
*Executive Director,* HyLab

**Biography**

**Ricardo Rato** is a Mechanical Engineer with a specialization in Energy from Instituto Superior Técnico (IST).
Passionate about Energy Transition and Innovation, he has built a career dedicated to helping companies navigate and lead in these transformative domains. His experience spans both national and international contexts, where he has successfully combined strategic consulting with hands-on research and development.
Over 15 years at the Welding and Quality Institute (ISQ), he progressed from Energy Consultant to Director of R&D and Innovation, leading high-impact projects and fostering cross-sector innovation.
Since September 2023, Ricardo has been serving as Executive Director of HyLab, where he continues to drive forward the hydrogen economy and clean energy solutions.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***Open Data, Open Innovation: The Experience of Creating E-REDES Open Data***

The energy transition requires more than just technology — it demands collaboration. E-REDES Open Data was created as a sharing tool and serves as a mechanism for open innovation and collaboration between E-REDES and the community. In this pitch, I share the experience of developing this open data portal and real-world use cases by municipalities, mobility operators, and researchers. From planning charging networks to creating energy communities, data has become a tool for local action.

**Luís Tiago Ferreira**
*Responsible for the Smart Cities, Public Lighting, and Open Data,* E-REDES

**Biography**

With more than 20 years of experience, including the support office to the General and Supervisory Board of EDP, Regulation and Energy Policy, strategic consulting, and network engineering. Graduated in Electrical and Computer Engineering from Instituto Superior Técnico.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

**Mónica Read**

*Projects and Works Engineer,*
Águas e Energia do Porto

***Room for PhDs in Companies? Here's what we think***

At Águas e Energia do Porto, we believe PhDs bring unique value to the future of water management.
As we rise to the challenges of the green transition, we're turning our treatment plants into living labs. And we don't ask whether there's space for PhDs – we ask how far their knowledge can take us.
Innovation needs both generalists and deep specialists. And we welcome both.

**Biography**

Mónica Read works in the Wastewater Treatment Department at Águas e Energia do Porto, where she currently manages public works contracts and leads the department's involvement in R&D and innovation projects, including Horizon Europe initiatives.
With over 17 years of experience in process and electromechanical design for water and wastewater treatment plants, she has led or contributed to national and international projects across Europe and Africa during her time at Efacec.
She holds a pre-Bologna degree in Environmental Engineering from the University of Lisbon and an Executive MBA from the Católica Porto Business School.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***KPMG Incentives: What It's Like to Be a PhD in a Big4 Company***

What happens when a researcher steps into the corporate world? In this talk, I'll share my journey from PhD to Consultant at KPMG Incentives, highlighting challenges, growth, and surprising overlaps. I'll also introduce KPMG and our R&D Incentives team, offering a glimpse into how academic skills can thrive—and drive impact—within a Big4 environment.

**Joana Monte**
*R&D and Innovation Senior Consultant,* KPMG

**Biography**

**Joana Monte** holds a PhD in Chemical and Biochemical Engineering from NOVA University Lisbon. She combines strong scientific knowledge with economic analysis skills. Following her PhD, Joana started her career pathway by working with companies, supporting them to obtain financial and tax incentives in Portugal. Specialized in guiding businesses to discover new growth opportunities, Joana supports companies in identifying and preparing applications for national funding programs. Over the past years, Joana accumulated expertise in the manufacturing industry, ICT, aerospace and automative sectors.

## ROUND TABLE WITH COLABS, CTIS AND INDUSTRY: DRIVING INNOVATION, SHAPING THE FUTURE

***Bridging Innovation Gaps: How INESC TEC Transforms PhD Excellence into Societal Impac***

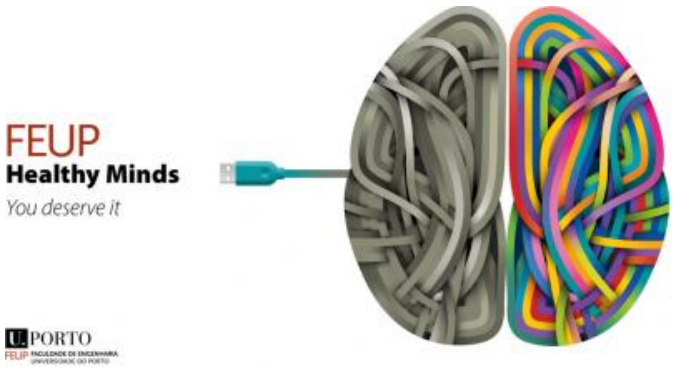
This presentation explores INESC TEC's core innovation challenges bridging our 8 research domains (AI, Computer Science, Communications, Power & Energy Systems, Robotics, Photonics, Bioengineering, Systems Engineering) with societal applications through TEC4 initiatives: TEC4INDUSTRY, TEC4ENERGY, TEC4HEALTH, TEC4AGRO-FOOD, and TEC4SEA. We showcase our collaborative academic model and comprehensive PhD integration strategy that develops tomorrow's leaders, demonstrating how our PhD graduates transition from university research to driving real-world societal impact.

**Luís Seca**
*Member of the Executive Board,*
INESC TEC

**Biography**

**Luís Seca** is a senior researcher at the Centre for Power and Energy and member of the Board of Directors of INESC TEC. His research areas are distributed electrical resources integration (renewable based electricity generation, electric vehicles, storage, etc.) in distribution and transmission grids, dynamic analysis of electrical systems, smart grids and energy efficiency. Luís is also one of the Directors of AATE, an Association created to support the coordination, management and communication activities of the ATE Agenda, maximizing the value delivered and ensuring the success of ATE projects. AATE also aims to lay the foundations for an energy cluster, through a dynamic and competitive ecosystem for the energy transition.

## WORKSHOPS




**Orientation and Integration Office – GOI**

**Fernanda Mendes** and **Helena Lopes**

*Psychologists, FEUPs GOI-Orientation and Integration Unit*

***Depression and Anxiety in PhD Students: Preventing Emotional Exhaustion and Burnout***

*Program:*

1. Depression and anxiety: what is it and what are its most common issues
2. Mental Health and Well-Being: tips to deal with worry, rumination, distress and emotional exhaustion

**Biography**

**Fernanda Mendes** is Psychologist at Faculdade de Engenharia da Universidade do Porto – Orientation and Integration Office Master Degree and First Degree in Psychology (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto). Full Member of the Portuguese Board of Psychologists. Specialty College of the Portuguese Board of Psychologists: General Specialty in Clinical and Health Psychology; Advanced Specialty in Psychotherapy.

**Helena Lopes** is Psychologist at Faculdade de Engenharia da Universidade do Porto – Orientation and Integration Office. PhD in Educational Sciences (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto). First Degree in Psychology (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto). Post-graduation studies: a) Motivation Psychology (Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra); b)Training Systems Assessment (Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto). Full Member of the Portuguese Board of Psychologists. Specialty College of the Portuguese Board of Psychologists: General Specialty in Educational Psychology.

## WORKSHOPS

**João Henrique Almeida**
*Psychologist, FEUP Talent Unit*

***My Carrer with a PhD: to Open UP or Close a Gap***

*Program:* FEUP Talent Unit is responsible for promoting the interaction between students and companies at the academia and the management of Alumni relations. One of our main goals is to promote different projects and initiatives to help students and graduates develop or enhance their skills. With this session you'll have the opportunity to get to know some of the projects that are being held by FEUP Talent Unit, namely some specific projects specifically designed for PhD students. Also, at this session you will have the chance to have a moment to think about where your PhD is as part of your career path and life design.

- What can I do with it?
- Is this a step to open up, or am I looking to close a gap?
- Do I need a plan B?

**Biography**

**João Henrique Almeida** is Psychologist, 33 years old and born in Viseu – a small city in the heart of Portugal. Working at the Faculty of Engineering of University of Porto, certified in career management and holding a master in Clinical and Health Psychology from University of Aveiro as well as a specialization in advanced coaching from University of Porto. Experienced trainer in topics such as career design, personal and professional development, leadership, communication, among others.

## WORKSHOPS

***La Caixa: Funding Opportunities***

The objectives of the session are to inform the audience about the different funding opportunities that the "la Caixa" Foundation offers through its various Fellowship Programmes, which cover the entire path of a researcher (undergraduate, postgraduate, PhD, and postdoctoral research) and highlight their main features. The workshop will focus on explaining the range of benefits that the programmes offer: financial support, training programmes on transversal skills, and networking opportunities. What does it mean to be a "la Caixa" Foundation fellow? One Doctoral INPhINIT fellow and one Junior Leader fellow will share their experiences with the audience.

Topics Covered:

- Postgraduate abroad fellowships programme
- Doctoral INPhINIT fellowships programme
- Postdoctoral Junior Leader fellowships programme
- Other funding opportunities
- Q&A.

**Gisela Calders**

*Doctoral Fellowships Programme Manager,* Fundació "la Caixa"

**Biography**

**Gisela Coromines** holds a bachelor's degree in Chemical Engineering (Universitat Politècnica de Catalunya, UPC), a bachelor's degree in Art History (Universitat de Barcelona, UB) and a master's degree in Humanities (Universitat Oberta de Catalunya, UOC). She has long experience in research management and funding. She joined the "la Caixa" Foundation in 2017 where she is part of the Research Fellowships programmes team.

## WORKSHOPS

***The ERC and the ERC-Portugal Programme: How Preparation Meets Opportunity***

The European Research Council (ERC) plays a pivotal role in enabling breakthrough research and fostering scientific leadership across all fields. This session focuses on the career development opportunities provided by the various ERC funding schemes and illustrate how these contribute to establishing independent research trajectories. It will also present the ERC-Portugal programme, launched by FCT as a national initiative to strengthen Portugal's participation in the ERC. The programme offers targeted support to researchers at different career stages and is structured around three complementary pillars:

ERC-PT Pre-Assessment – an innovative initiative that offers peer-review services through an Annual College of Reviewers composed exclusively of former ERC panel members, aiming to improve the quality and success rate of ERC proposals;

ERC-PT A-Projects – a scheme that funds the early development of top-rated but unfunded proposals, helping prepare for future ERC resubmissions;

ERC-PT Careers – a programme that promotes the recruitment and long-term integration of ERC grantees in Portuguese institutions, through attract-and-retain mechanisms.

Together, these mechanisms create a coherent national strategy that enhances researcher competitiveness, reinforces institutional capacity, and aligns with broader goals for research excellence and talent attraction. The session will explore synergies between European and national instruments and offer practical guidance for navigating the ERC landscape.

**Biography**

**Rui Munhá** has been a Science Officer in the Department of International Relations of the Portuguese Foundation for Science and Technology (FCT) since 2014. He is currently Co-Coordinator of the National Contact Points of the European Programme for Research and Innovation Horizon Europe, and he also represents FCT and Portugal in different governing bodies in the context of the European Union or International Organisations. Rui Munhá obtained a PhD in Chemistry in 2011, and he developed his scientific activity at the University

## WORKSHOPS

**Rui Munhá**
*Science Officer,* FCT

**Bruno Béu**
*Advisor to FCT's Board of Directors,* FCT

of Lisbon, University of British Columbia (Vancouver, Canada), University of California (Irvine, USA) and the University of Aveiro. Rui was born in Lisbon, in 1979.

**Biography**

**Bruno Béu** holds a PhD in Philosophy from the University of Lisbon. His academic work focused on philosophy of language, literature, aesthetics and linguistics, and he has taught in several of these fields at the School of Arts and Humanities of the University of Lisbon. He was the principal investigator of an interdisciplinary research line in comparative studies, developed in collaboration with national institutions, and is the author or editor of two books and numerous articles and book chapters.

He has held various roles in science and research policy, including senior scientific officer for the Humanities and Social Sciences at the Evaluation Office of the Fundação para a Ciência e a Tecnologia (FCT), advisor to the Lisbon City Council in the field of education, and executive coordinator of the academic open access publishing house Imprensa de História Contemporânea.

He currently serves as advisor to the FCT Board of Directors in the areas of strategy and evaluation and is director of the ERC-Portugal programme. He is the national delegate to the ERC Programme Committee and to the OECD's Committee for Scientific and Technological Policy (CSTP), and the designated focal point for the Portuguese delegation to all OECD bodies in the field of STI. He also co-chairs the Portuguese National Chapter of the Coalition for Advancing Research Assessment (CNP-CoARA).

## SCIENCE COMMUNICATION | Hackathon Program

**António Coelho**
*Associate Professor,* DEI/ FEUP

***Hackathon Program***

**Goals:** Science communication is a very relevant competence for researchers, promoting greater impact, relevance and innovation. More specifically:

- Develop Real Solutions: Create prototypes that help companies communicate effectively with different audiences, particularly at stands, fairs or events.
- Bringing the Academic Community and Companies Closer Together: Fostering collaboration between doctoral students and company professionals, establishing bridges for sharing knowledge and innovation.
- Train and Inspire: Provide an intensive learning, teamwork and networking experience where participants will have access to expert mentors who will support the development process.
- Promote the Doctoral Symposium: Integrate the best projects and teams into the Doctoral Symposium program, reinforcing the connection between academia, research and the business sector.

**Biography**

Associate Professor with Habilitation at the Department of Informatics Engineering, Faculty of Engineering (FEUP), University of Porto (UP), director of the Doctoral Program in Digital Media at the University of Porto and academic leader of the EUGLOH European University Alliance.
Senior Researcher at the Center for Human-Centered Computing and Information Science (HumanISE) of INESC TEC with research interests in the areas of Computer Graphics, Extended Reality, Serious Games, and Accessibility.

## SCIENCE COMMUNICATION | Five-Minute for 3 Teams of PhD Students


Team 1 – ***Dino e a Cadeia da Vida***

Dino e a Cadeia da Vida is an educational game for children aged 8 to 12, designed to promote sustainable habits in a playful and effective way. Dino, a dinosaur who has traveled through time, discovers that the future of humanity is threatened by environmental destruction, caused by humans themselves! Determined to prevent life on Earth from suffering the same fate as his species – extinction – he mobilizes children to encourage sustainable habits on the planet. Through three interactive mini-games based on the 3 R's (Reduce, Reuse, Recycle), players face real environmental challenges. With the guidance of Dino and his friends Kiki (the turtle), Akua (the blue whale) and Vinee (the polar bear), each action transforms the the game and the planet itself. In the end, the positive impact of the children's choices makes it possible to divert the course of the meteor from extinction, reinforcing the message that small actions generate big changes.

– Project Description
– Logo
– Poster
– Team Photo

**The Meteorite Busters**

- Ana Camarinha – Idea and Sketching
- Jorge Ferreira – Game Development
- Raushan Mukhamejanova – Idea and Sketching
- Rosana Oliveira – Narrative

SCIENCE COMMUNICATION | Five-Minute for 3 Teams of PhD Students

Team 2 – ***Time Travelers***

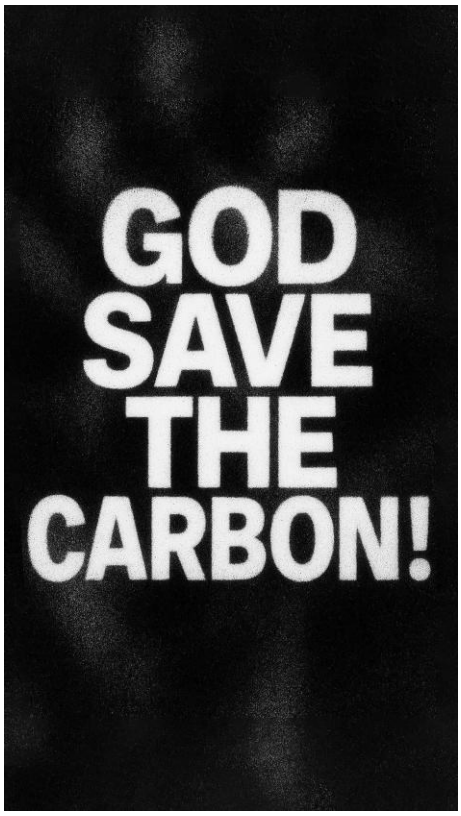
Time Travelers is a mobile application designed to transform the way tourists experience the city of Porto. It offers an immersive, user-centered journey through historical landmarks using geolocation, image recognition, and soundscapes. By simply pointing their phone at a monument or taking a selfie with it, users are instantly immersed in rich, verified historic
al content drawn from credible sources. With personalized routes and real-time notifications, the app enables users to explore at their own pace, avoiding crowded tours and unreliable information. It combines storytelling, cultural authenticity, and digital innovation to deliver a memorable and educational experience — ideal for tourists like Ashley, seeking depth, authenticity, and convenience.

– Project Description
– Logo

**Team**

- Ana Cristina (organization, creation)
- Bárbara Bender (organization, creation)
- Diana Sousa (website, app)
- Jadna da Cruz (website, app, gps, image recognition)
- Miguel Guimarães (website, app, gps, image recognition)

SCIENCE COMMUNICATION | Five-Minute for 3 Teams of PhD Students




Team 3 – ***God Save the Carbon***

Carbon emission levels are steadily rising, as is the average global temperature. Also, evidence shows that "greening education" and "green skills" are increasingly necessary. This project aims to encourage behavioral change among Gen Z FEUP students and raise awareness about sustainable transportation habits. Combining self-reported routines with gamified learning, we create a simple yet effective system to nudge users toward more eco-conscious decisions based on the Self-determination Theory and the Fogg Behavior Model. The "God Save the Carbon" app, designed with an eco-punk style, is simple, fast, shareable, educational, and career-worthy. Users can log their daily transportation eco-choice, take quick quizzes (learning through micro-challenges), and be awarded badges and LinkedIn certificates. There are two punctuation mechanisms. One is related to the user's transportation habits, where the points are measured in comparison to the CO2 emission of a standard fuel car, which is reflected in the user's avatar evolution. The other concerns the user's correct answers to the daily quizzes, allowing them to unlock new levels and gain badges and shareable certificates.

– Project Description
– Logo

**Atomic**

- Elizaveta Osipovskaya – Storytelling Wizard
- Fernando Osório – Calculations
- Mariam Conceição – Sparkler
- Priscila Reinaldo – PR Developer
- Sebastião Ventura – Researcher
- Safa Vakili – UI Magician

## VENTURE SCIENTISTS

**Carrie Baptist**
*Chief Strategy Officer,* Conception X

***What is Conception X?***

Conception X empowers PhD students to become Venture Scientists – PhD founders who bridge the gap between academia and industry. Whether you're already working on a startup or interested in learning how to translate and commercialize your research, our program supports accelerating your understanding of entrepreneurship.

**Biography**

**Carrie** is Chief Strategy Officer of Conception X, Europe's largest PhD deeptech venture programme. Conception X works with PhD scientists from 65+ Universities across Europe, providing a large cross-University platform for PhD founders, unlocking innovations from the lab and accelerating early stage research commercialisation.

**Joana Loureiro**
*Assistant Professor,* LEPABE/ALiCE, FEUP

***A Success Case: FTNanoAD-Targeted-Nanocarriers for Brain Diseases***

BNanoTech, Inc. was founded on 02/03/2025 by Joana Loureiro and Maria do Carmo Pereira. The company's technology originated from research conducted at the Laboratory for Process Engineering, Environment, Biotechnology and Energy (LEPABE), thus reinforcing the company's strong connection with FEUP. The company develops controlled release systems for transporting drugs to the brain. The target market of BNanoTech, Ltd. includes pharmaceutical and biomedical industries interested in advanced therapies for neurodegenerative diseases, with potential for strategic partnerships and commercialization at national and international levels. Our participation in the Conception X program resulted directly in XTX Ventures proposing a £100,000 investment in our technology, which led to the faster creation of BNanoTech.

**Biography**

**Joana A. Loureiro** is an Assistant Professor at the Faculty of Engineering of the University of Porto (FEUP) and a senior researcher at the Laboratory for Process Engineering, Environment, Biotechnology, and Energy (LEPABE). She earned her Ph.D. in Chemical and Biological Engineering from the University of Porto. Her research focuses on nanotechnology, particularly the development of functionalized nano-drug delivery systems for therapeutic applications, studies on amyloidogenic peptides, and the design of nanoparticles targeting the blood-brain barrier. She is/was involved in several projects (>17) for developing nanoengineered structures for the controlled delivery of bioactive molecules and has been in active collaboration with several national and international research groups. Dr. Loureiro has contributed to numerous scientific publications in these fields and supervised over 25 PhD and Master's students.

## VENTURE SCIENTISTS

**Raphael Stanzani**
*Entrepreneurship Programs Manager,* UPTEC

***School of Startups at UPTEC***

At the School of Startups, UPTEC – Science and Technology Park of the University of Porto offers dedicated programs that support different innovation pathways for entrepreneurs, researchers, students, and corporations. It's a 3-month business idea acceleration program that provides the boost your idea needs to thrive. With 90+ hours of intensive hands-on training and personalized mentorship from industry experts, this program will help you validate your idea within the market.

**Biography**

**Raphael**, the Entrepreneurship Programs Manager at UPTEC, designs and executes startup acceleration workshops to transform innovative ideas into sustainable businesses that can scale and attract investment. He graduated from UFSCar (Brazil) with an MBA from Quantic School of Business (US). Has experience as Supply Chain Projects Manager at Procter & Gamble in Brazil and Territory Sales Manager for the Oral-B brand at Procter & Gamble Portugal. He also co-founded Connect Robotics, a drone delivery startup that received funding from ESA and EU. The startup was incubated at UPTEC, accelerated by Carnegie Mellon University, and a spin-off from the University of Porto.

**Bruno Azevedo**
*CEO,* AddVolt

***A Success Case of a Spin-Off FEUP: AddVolt***

AddVolt is a technological company that developed the world's 1st plug-in electrical system targeted for transportation markets. With our technology, refrigeration trucks can perform their cold operation in electric mode, reducing diesel dependence, the level of noise, and CO2 emissions.

**Biography**

**Bruno** is the CEO and co-founder of AddVolt, the powerhouse that developed the world's first solution to replace the 4.5 million diesel engines used in refrigerated transport. He and his three co-founders have been dedicated to this innovative project since their university days. During the past ten years, he has also honed his commercial acumen, propelling Addvolt to the forefront of sustainable transport technology. Bruno holds a Master's in Electrical Engineering from FEUP – University of Porto. He further enhanced his expertise by completing a business and management program at Carnegie Mellon University. In recognition of his achievements, Bruno was honoured by Forbes in 2020, being named to the 30 Under 30 list in the Manufacturing & Industry category.

## VENTURE SCIENTISTS | Five-Minute Pitch for PhD Students

**Amir Hossein Farzamiyan**

*PhD Student, Doctoral Program in Telecommunications,* FEUP

***LogIoTrix, Smart Inventory Management***

LogIoTrix is a smart inventory management system that uses connected sensors to monitor stock levels automatically. The data is sent to the cloud, where it's analyzed using AI to predict demand and optimize inventory. This allows businesses to make faster, data-driven decisions, reduce waste, and ensure the right products are always available—without relying on manual tracking.

**Luiza Sena**

*PhD Student, Doctoral Program in Environmental Engineering,* FEUP

***FertiGo – Wastewater in. Fertilizer out.***

Compact and automated system for the recovery of nutrients from wastewater. It works by mixing wastewater rich in nutrients with chemicals to produce solid fertilisers. The entire process takes place in a small (< 1 m3) transportable unit that can be moved between plants as needed. This portable unit incorporates patented technology characterised by an efficient mixing mechanism which significantly increases heat and mass transfer in continuous mode. This enables precise control of the physical and chemical properties of the resulting fertiliser.

## VENTURE SCIENTISTS | Five-Minute Pitch for PhD Students

**Rita Martins**
*PhD Student, Doctoral Program in Chemical and Biological Engineering,* FEUP

**Inês Freitas**
*PhD Student, Doctoral Program in Chemical and Biological Engineering,* FEUP

***EcoWires – Plastic-free smart packaging***

EcoWires offers a new printing technology for flexible electronic circuits, taking advantage of abundant, affordable and renewable sources, unlike conventional electrical conductors. A conductive ink made of carbon nanoparticles is printed inside the final substrate, a transparent cellulose film, avoiding the need for an extra insulation layer deposition. Using EcoWires technology, we are developing plastic-free smart packages with chipless RFID antennas integrated during the manufacturing process. With EcoWires, businesses can embrace the IoT era sustainably, providing distributors and retailers the dual benefit of a reduced carbon footprint through plastic-free packaging and enhanced profitability by enabling advanced product tracing and improved consumer engagement.

**Joana Cerqueira**
*PhD Student, Doctoral Program in Biomedical Engineering,* FEUP

***MyKneeRecovery – Precision Monitoring for Better Rehabilitation***

MyKneeRecovery is an innovative system that helps to monitor a patient's knee recovery after surgery by providing accurate, real-time data on movement and muscle activity. It includes wearable sensor-embedded stockings equipped with motion sensors (IMUs), temperature sensors, and EMG sensors that track how the knee is moving and how the muscles are working during rehabilitation exercises. The system also features a 3D thermal imaging tool that captures the shape and temperature of the knee to assess inflammation and healing. All this information is sent to a mobile app, where patients and clinicians can easily view progress, detect problems early, and adjust recovery plans as needed. Unlike traditional systems, MyKneeRecovery is portable, affordable, and easy to use at home or in a clinic, making recovery monitoring more objective and available to more people.

## VENTURE SCIENTISTS | Five-Minute Pitch for PhD Students

**Manuel Fernandes**
*PhD Student, Doctoral Program in Electrical and Computer Engineering,* FEUP

***UPWIND – Portable, Clean and Affordable Electrical Energy for All***

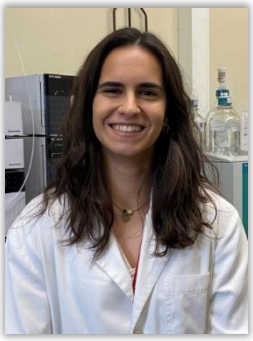
UPWIND is developing a portable wind-powered generator based on Airborne Wind Energy (AWE) technology. The core of the technology is a fixed-wing drone (resembling a kite) that is tethered to a ground station by a cable. This cable winds around a rotating drum connected to an electric generator. As the drone flies at high altitudes (200-300m) where winds are stronger and more consistent, it harnesses wind energy, causing the cable to unwind and turn the drum, thus generating electricity. Once the cable fully extends, the generator retracts it, and the cycle repeats. A key innovation of UPWIND is its unique automatic Circular Take-Off and Landing (CTOL) system, which allows for fully autonomous operation without sacrificing efficiency.

**Ana Teixeira**
*PhD Student, Doctoral Program in Informatics Engineering,* FEUP

***BodyBoost – Stop Injuries Before They Stop You***

BodyBoost is a discreet, smart wearable worn on the lower back that continuously monitors posture and movement throughout the day. It quietly detects when someone starts falling into poor postural habits and responds instantly with a gentle vibration, just enough to prompt a quick, natural correction without interrupting their work. What sets BodyBoost apart is how it turns these moments into meaningful insights. Workers can track their own progress through a simple mobile app, helping them build better habits over time. At the same time, employers can access anonymised team-level data that highlights broader trends and risks, allowing for safer work environments without compromising individual privacy. Designed to be practical for everyday use, BodyBoost fits seamlessly into any routine, offering real-time support and long-term improvement, without adding complexity.

## VENTURE SCIENTISTS | Five-Minute Pitch for PhD Students



**Rita Barros**

*PhD Student, Doctoral Program in Chemical and Biological Engineering,* FEUP

***Triple-Action Cutaneous Device for Skin Cancer Treatment***

The proposed technology is a skin patch designed to treat skin cancer in a targeted and non-invasive way. It works like a glucose monitor, but instead of tracking blood sugar levels, it triggers photo and biocatalytic reactions that can harm the tumour cells when exposed to light. The patch is composed of three main components:

- Graphitic Carbon Nitride (GCN): A metal-free semiconductor activated by visible light that can generate toxic radicals to kill cancer cells.
- Glucose Oxidase (GOx): An enzyme that consumes glucose from the tumour microenvironment, starving the cancer cells of essential nutrients and producing hydrogen peroxide as a by-product.
- Haemoglobin (Hb): An iron-containing protein found in red blood cells that helps convert hydrogen peroxide into highly reactive species (through Fenton reactions) that can destroy cancer cells.

When the patch is applied to the skin and exposed to light, it simultaneously activates three powerful therapies, all at once: Photodynamic Therapy (PDT), Chemodynamic Therapy (CDT) and Starvation Therapy (ST). These therapies deliver precise, effective, and localised cancer treatment with minimal harm to healthy tissue.

## PLENARY LECTURE

**Margarida Mano**
*Vice-Rector,* Universidade Católica Portuguesa

***Leadership at the Intersection of Academia, Policy, and Development: Bridging Knowledge to Impact Society***

In the fast-paced world we live in, where uncertainty and unpredictability make context and its complexity more evident, solving society's new (old) problems seems more challenging than ever. Yet, how is that so? It is true that the interconnections between problems are now clearer and denser. It's also true that the development of new approaches is always slower than reality. But something new is the awareness that, more than ever, solutions must respond to seemingly contradictory tensions. How can one, by specializing, strive to gain more breadth and still be a generalist? In society, as in the markets, how can we create space for fantasy and creativity in a world of hierarchies? To what extent does critical freedom strengthen scientific or political leadership?

In this lecture, we will look at some ways of helping to balance these tensions. This is the case with knowledge and the role of academic freedom in its development. This is the case of interdisciplinarity and the potential for effective dialog between fields and experts. It's the case of a liquid society where people, audiences, actors and influencers attract each other and move around. It's the case of researchers who, with their knowledge, determine scientific impacts and drive real changes in society.

**Biography**

**Margarida Mano** with a PhD in Management from the University of Southampton, she is currently Vice-Rector for Continuous Improvement and Development at the Universidade Católica Portuguesa and President of the Board of TI-Portugal, the Transparency and Integrity Association. She is also Chairwoman of the General Assembly of FORGES (https://aforges.org/) and a member of the Supervisory Board of the Order of Engineers. Minister of Education and Science in the XX Government of the Republic (2015) and Member of the Portuguese Parliament, in the XIII Legislature, with responsibilities in the areas of Education, Higher Education, Science, Culture, Communication, Youth and Sport, and represented the Portuguese Parliament in the Parliamentary Assembly of the Union for the Mediterranean, where she chaired the Committee on Economy, Finance, Social Affairs and Education. She has been Vice-Rector of the Portuguese Catholic University since 2020. Until 2015 has held management positions in Banking and at the University of Coimbra as Vice-Rector, Pro-Rector and Administrator. Professor at the Faculty of Economics of the University of Coimbra since 1986 in the areas of Economics and Management. Strategic Management (prospective analysis, scenario), Change Management, Quality and Governance Models stand out as areas of scientific interest.

## Symposium on Transport Systems and Mobility

### SESSION I | URBAN MOBILITY AND PUBLIC TRANSPORT

**Marco Martins**

*Presidente do Conselho de Administração,* TMP — Transportes Metropolitanos do Porto

***Revolutionize mobility in the Porto Metropolitan Area: enhance public transport***

This presentation will address the main mobility challenges in the Porto Metropolitan Area (PMA), particularly in what concerns traffic congestion and the impact of the VCI (Inner Ring Road). The presentation will highlight the ongoing efforts to promote public transport, including the expansion of the metro network, the introduction of passenger services on the Leixões railway line, the extension of the Andante fare system to the Vouga line, and the development of river crossings. Focus will be given to the creation of TMP – Transportes Metropolitanos do Porto, marking a turning point in the organization and management of mobility in the PMA. TMP is a transport authority, implementing an integrated planning model, and influencing policies on fares, intermodality, and sustainability. The presentation will also discuss the initial results of TMP's operations, the challenges it faces, and its potential as a catalyst for a transformation in urban and metropolitan mobility across the region.

**Biography**

Marco Martins is an experienced public administrator and political leader, with over two decades of experience in local governance and public service. Serving as Executive President of Transportes Metropolitanos do Porto, since February 2025, while maintaining his role as Municipal Councilor at Câmara Municipal de Gondomar, since 2013. He holds a master's degree in public administration from Universidade do Minho, and a degree in Economics and Business Management from Universidade Portucalense, combining academic knowledge with extensive practical experience in public sector leadership and metropolitan transportation governance.

## SESSION II | LOGISTICS

**Hugo Lopes**
*Diretor de Desenvolvimento e Sustentabilidade*, APDL — Administração dos Portos do Douro, Leixões e Viana do Castelo

***Sustainable Mobility – Maritime Transport, Ports, and Intermodality***

This presentation will highlight the strategic role of the blue economy and maritime transport in the transition towards more sustainable mobility. With a focus on the Port of Leixões, Hugo Lopes will address international and European decarbonization targets, regulatory challenges, and emerging technological solutions, such as the use of alternative fuels (hydrogen, methanol, ammonia, biofuels) and the electrification of ships and port infrastructure.

The presentation will also emphasize the importance of innovation and energy efficiency in reducing greenhouse gas emissions in the maritime sector. The decarbonization roadmap for the Port of Leixões, which aims to achieve carbon neutrality by 2035, will be presented, including ongoing actions such as the installation of onshore power supply (OPS) systems, the production of renewable energy (solar, wind, and wave), the digitalization of logistics processes, and the promotion of intermodality.

The vision to be presented positions Leixões as a sustainable urban port – deeply integrated with the surrounding community and committed to public health, operational efficiency, and environmental responsibility.

**Biography**

Hugo Lopes is a civil engineer specializing in hydraulics, coastal engineering, and physical modeling, currently serving as Director of Development and Sustainability at APDL. With a PhD in Civil Engineering and a MBA from Porto Business School, he has over 10 years of experience in port infrastructure development. Hugo combines his executive role with academic engagement as an Invited Associate Professor at ISEP and active participation in professional organizations including APRH, PIANC International, and ICS FEUP, making him a recognized expert in sustainable maritime infrastructure in Portugal.

## SESSION II | LOGISTICS

**João Filipe Jesus**
*Head of Corporate Finance,*
Dourogás

***Tackling decarbonization, from H2Driven to a more sustainable society***

Dourogás Renovável – Produtora de Gás, SA is a key player in Portugal's energy transition, leading the development of renewable gases such as green hydrogen and biomethane. The company has secured major wins in the country's first national auctions, including exclusive awards in the biomethane segment, and is advancing six green hydrogen projects with 150 MWh capacity by 2026. It pioneered biomethane injection into the national grid and integrates renewable energy into mobility and industrial decarbonization solutions. Through innovative projects like Move2LowC, HyFuelUp, and H2Driven, Dourogás is helping shape a regulated renewable gas market and driving Portugal towards carbon neutrality.

**Biography**

João Filipe began his career at Montepio Bank, as an Advisor to the Strategy and Planning Department, managing M&A processes. Hence, João pursued a career as Regional Director for Alentejo at the Ministry of Economy and Innovation, overseeing a broad spectrum of economic sectors, such as industry, energy, trade, and services. Over the past 8 years, João has been the Head of Mobility Operations at Dourogás GNV, having recently transitioned to the Head of Finance's role at Dourogás Renovável. João has also been an active non-executive board member of GASNAM, the Iberian Natural & Renewable Gas Association for Mobility. Since 2023, he´s been Head of Corporate & Project Finance in the Dourogás Group.

## SESSION IV | URBAN MOBILITY AND PUBLIC TRANSPORT

**Bruno Oliveira**
*Researcher,* OPT — Otimização e Planeamento de Transportes

***Public transit systems planning and scheduling – problems and methodologies.***

Bus planning and scheduling are critical components for the efficient operation of public transport systems.
Ensuring compliance with both passenger demand and operational constraints requires the application of optimization techniques and specialized solution methodologies. This presentation focuses on the challenges of bus and crew scheduling, outlining the principal algorithmic approaches employed to solve these problems.
Additionally, we address the emerging complexities introduced by the electrification of bus fleets, which impose new constraints and require adaptations to existing planning and scheduling frameworks.

**Biography**

Bruno Miguel Oliveira holds a PhD in Transportation Systems from the Faculty of Engineering of the University of Porto and a master's degree in Statistics and Operations Research from the Faculty of Sciences of the University of Lisbon. Currently working at OPT – Otimização e Planeamento de Transportes, his main focus is in the development of solution methods for planning and scheduling public transport operations, using operational research methodologies.

# ORAL COMMUNICATIONS

## List of Oral Communications

# OC 1. Collaborative logistics and heuristic optimization for sustainable last-mile urban distribution

**Alisson Garcia-Herrera**[1], Adrian Serrano-Hernandez[1], Javier Faulin[1]
[1]Institute of Smart Cities, Public University of Navarre, Pamplona, 31006, Spain
Presenting author email: alisson.garcia@unavarra.es

**Abstract**

The rapid growth of cities and e-commerce has made last-mile logistics increasingly complex, challenging traditional delivery systems with rising costs, congestion, and environmental concerns. In this context, crowdshipping has emerged as a promising, technology-enabled alternative. It relies on occasional drivers, individuals who deliver parcels during their regular routes, coordinated by digital platforms. This model, inspired by city and crowd logistics principles, seeks to optimize urban resources and improve service accessibility while promoting social inclusion. However, its effectiveness depends on how well it is integrated with existing systems, as it may also introduce logistical inefficiencies and negative externalities if not properly managed [1].

This study explores crowdshipping as a complement to traditional last-mile delivery systems by developing optimization models that consider both environmental and economic objectives. One such model is based on a variant of the Team Orienteering Problem which aims to design efficient routes that maximize delivery rewards and minimize travel distance, subject to constraints such as driver availability, travel time, and load capacity. The system allows in-store customers to act as occasional carriers, while companies coordinate tasks, set compensation schemes, and manage the interaction between traditional and crowd-based logistics.

To support efficient decision-making under operational constraints, the study also addresses optimization algorithms capable of producing high-quality solutions in short computing times. Among these, heuristic-based approaches with probabilistic elements are considered for their ability to balance solution quality and computational efficiency in complex routing scenarios.

The research evaluates the system's performance in terms of cost savings, reduction of vehicle kilometers traveled, and lower emissions. The results offer insights into how collaborative and sustainable logistics strategies can improve the resilience and efficiency of last-mile delivery in evolving urban environments.

**Acknowledgments**

This work was supported by the Welcoming International Talent (WIT) Project of the Government of Navarra (Spain). This Project has received funding from the European Union's Horizon 2020 research and innovation program under Marie Sklodowska-Curie grant agreement No. 101034285.

**References**

[1] Buldeo Rai, H., Verlinde, S., Merckx, J., & Macharis, C. 2017. "Crowd logistics: an opportunity for more sustainable urban freight transport?" European Transport Research Review, 9, 1-13.

# OC 2. Mobility in low-density areas: a framework for designing Demand Responsive Transports

**Armando Dauer**[1,2], Teresa Galvão[,2], Jorge Pinho de Sousa[1,2], Bruno Prata[3]

[1] INESC TEC, Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal
[2] Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal
[3] UFC, Federal University of Ceara, Campus do Pici - Brazil
Presenting author email: armando.dauer@inesctec.pt

**Abstract**

Large urban centers are usually served by traditional Public Transport (PT) systems, which take advantage of the large demand available to center their operations on efficient routes and schedules. By contrast, in regions with a low population density, the availability of transportation is highly impaired since these same systems struggle to find an economically viable operation. The technological advances of the last decades allowed the design of transport alternatives to mitigate this problem, such as the Demand Responsive Transport (DRT) systems [1]. These are systems with flexible configurations, capable of adapting their operation to the current demand, by altering their vehicle routes, schedule, type, and size of the fleet, among other characteristics [2]. However, the designing process of these systems involves the selection of their operational configuration through a large number of possibilities. Moreover, the heterogeneity of service areas and the lack of expertise of planners turn designing these systems into a hindered endeavor [3]. Focusing on assisting the project of DRTs, this work presents a framework for designing DRTs on a strategic level. Through the analysis of the available literature, along with a set of real-world DRTs from 24 different countries, this work proposes a methodological process to select, test, and evaluate different configuration proposals for designing a DRT suitable for the scenario presented. The APOLO framework, lists and groups key systems variables according to their impacts on the DRT (strategic decisions, operational impacts, or passenger service). Then, a group of decision and simulation tools are presented to assist in selecting the most suitable domains for the system configuration, through an interactive process.

**Acknowledgments**

The authors gratefully acknowledge the financial support of “Fundação para a Ciência e Tecnologia” (FCT – Portugal), through the Ph.D. Studentship 2021.07413.BD. This study was also partially financed by the Coordination for the Improvement of Higher Education Personnel (CAPES), the National Council for Scientific and Technological Development (CNPq), through grants 309755/2021-2, and 407151/2021-4.

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[2] J. Mageean et al. (2003) Demand responsive transport: responding to the Urban Bus Challenge. In Proceedings Of The European Transport Conference (Etc) 2003 Held 8-10 October 2003, Strasbourg, France.
[3] A. Papanikolaou et al. (2017) A methodological framework for assessing the success of Demand Responsive Transport (DRT) services. Transportation Research Procedia, 24, 393-400.

# OC 3. Understanding Urban Mobility Patterns - Analysis of Porto's Mobility Survey

**Beatriz Cavaleiro**[1], Teresa Galvão Dias[2], Marta Campos Ferreira[2]

[1]Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal
[2]INESC TEC, Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal
Presenting author email: 202308609@fe.up.pt

**Abstract**

Urban mobility is a key factor in achieving Europe's climate, environmental and social goals. The European Commission's New Urban Mobility Framework 2021 emphasises a shift to-wards sustainable, inclusive and efficient mobility systems, highlighting the importance of collective and active transport, zero-emission urban logistics and improved connectivity be-tween urban and rural areas [1]. Sustainable Urban Mobility Plans (SUMPs) play a crucial role in this strategy by integrating transport planning with climate, energy and spatial strate-gies [1]. The implementation of sustainable mobility policies may face significant social, economic and cultural challenges that need to be carefully assessed [2]. Understanding the distribution of transport modes used by the population for both daily and long-distance trips is fundamental to evaluating the sustainability of a transport system. Several factors influ-ence the population's choice of transport mode, some are related to the availability of infra-structure and services, while others are more social in nature, linked to demographic struc-ture, economic activity or spatial patterns [2].

Based on these considerations, this study focuses on the municipality of Porto, the second-largest city in Portugal, using data collected from a mobility survey conducted at the end of 2024, which yielded a total of 4,749 responses. The primary objective is to explore mode choice patterns and examine their correlations with socio-demographic variables, providing data-driven insights to support the development of more sustainable and inclusive transport strategies. Following a comprehensive literature review, the survey data was cleaned using the CRISP-DM methodology to ensure accuracy and consistency. An exploratory data analy-sis was then conducted to identify relevant mobility patterns and key influencing factors. By analyzing travel behavior in Porto, this research provides insights to support targeted policies for sustainable development, improved quality of life, and transport system efficiency. It also reflects how mobility patterns relate to the city's socio-demographic and spatial context, contributing to broader European goals for climate neutrality and sustainable urban mobility.

**Acknowledgments**

The authors thank OPT, S.A. for providing the data necessary for this work.

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# OC 4. Influence of Weather Conditions on Railway Accident Occurrence in Portugal

**Belzénia Matsimbe**[1], Sara Ferreira[1]

[1]CITTA, Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal
Presenting author email: up2408583@up.pt

**Abstract**

Extreme weather events increasingly threaten railway safety and infrastructure reliability. In Portugal, the contribution of meteorological conditions to railway accidents remains insufficiently studied. This research investigates the association between weather and two accident types defined by the Instituto da Mobilidade e dos Transportes (IMT): derailments and collisions with obstacles on the track. The analysis focuses on three heavy rail lines with distinct operational characteristics: Linha da Beira Alta, Linha do Norte, and Linha de Sintra.

Accident data from 2014 to 2024 will be obtained from IMT and combined with meteorological records from the Instituto Português do Mar e da Atmosfera (IPMA). The selected variables include daily total precipitation, maximum and minimum air temperature, mean wind speed, and wind gusts. Storm events will be defined as days with precipitation above the 95th percentile and gusts exceeding 50 km/h, following IPMA thresholds. To address class imbalance resulting from the rarity of these accidents, logistic regression models will be applied using oversampling methods, including the synthetic minority oversampling technique (SMOTE). Time-series analysis will complement the statistical approach by identifying seasonal variability.

Geospatial analysis will be conducted using QGIS software. Accident locations and meteorological exposure will be analysed using line segmentation based on operational divisions provided by Infraestruturas de Portugal (IP). The study recognises limitations in the spatial resolution of meteorological data, especially for wind and storm events, and accounts for potential confounding factors such as technical failures and human error.

This methodological approach builds on prior research regarding the impacts of climate on railway safety and operations (Vicente et al., 2020; Kim et al., 2024). The findings aim to inform climate adaptation and risk mitigation strategies for the Portuguese railway network.

This study is part of an ongoing PhD project at the University of Porto.

**Acknowledgments**

The author gratefully acknowledges the financial support provided by Ciência LP for her doctoral research.

**References**

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[2] Kim, JM., Adhikari, M.D. & Yum (2024). Development of a deep neural network-based life accident evaluation model for weather-related railway accidents. KSCE Journal of Civil Engineering, 28, 1551–1565.

# OC 5. Resilience and Flexibility of Transport Systems in Tourism Management Companies: Strategies to Address Uncertainty and Risk

**Carmen Santos Lima**[1], Jorge Pinho Sousa[1], João Claro[1]

[1] INESC TEC, Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal
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**Abstract**

Tourism management companies operate in dynamic and uncertain environments, marked by demand volatility, policy shifts, disruptive events, and technological change. Ensuring the resilience and flexibility of transport systems is therefore critical to maintaining operational continuity and long-term competitiveness. This research develops a conceptual framework to enhance transport system resilience and flexibility in tourism contexts. The methodology combines a systematic literature review with qualitative data collection, including expert interviews, participant observation, and surveys. Drawing on key contributions from [1-3], the framework integrates transport infrastructure, service design, and organisational structures. The study is guided by three core research questions: (1) What are the major challenges tourism companies face in strengthening transport resilience and flexibility? (2) What strategies can effectively mitigate risks and uncertainty? (3) What are the measurable benefits of adopting such strategies?

Preliminary results identify key vulnerabilities and strategic responses, which will inform the development of best practices and decision-support tools. Fieldwork is currently being conducted within a company of the Mystic Invest Group, ensuring practical application and relevance.

This research offers valuable insights for both academic and industry audiences by contributing to the design of transport systems capable of adapting to continuous change in the tourism sector.

**Acknowledgments**

The author gratefully acknowledges the support of Dr. Mário Ferreira, Chairman of Mystic Invest Holding, whose commitment to innovation and development in the tourism sector has made this research possible. The financial support provided by Mystic Invest Holding for this doctoral programme is sincerely appreciated. The author also recognises the valuable opportunity to apply the research outcomes within one of the Group's companies, which reinforces the practical relevance and impact of the work.

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# OC 6. Improving Port Performance through Synchronised Operations: a Modular Decision Support System

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**Abstract**

Despite playing a critical role in global supply chains, container terminals face persistent challenges related to operational inefficiencies, resource misalignment, and environmental impacts. This research addresses those challenges by developing a modular decision support system (DSS) aimed at improving the performance of container operations in the terminal, through the synchronised management of its key subsystems. The proposed DSS integrates three interconnected modules to support decision-making across different stages of terminal operations [1].

The first module investigates the application of Just-In-Time (JIT) strategies to regulate vessel arrivals and optimise sailing speeds as ships approach the port. By reducing early arrivals and idle time at the anchorage, this module aims to lower fuel consumption and minimise emissions [2]. The second module evaluates terminal performance metrics, such as productivity, waiting times, and equipment utilisation, under various operational scenarios. It allows port managers to test strategic adjustments and investment options in a risk-free virtual environment. The third module addresses the coordination between terminal yard operations and hinterland transport systems, aiming to improve the synchronisation of internal and external logistics flows.

To effectively address these challenges, this research explores the synergies between simulation and optimisation models to design a DSS that provides strategic recommendations to improve seaport operations and enhance the whole system resilience.

Therefore, together, these modules form an integrated DSS designed to enhance the efficiency, sustainability, and resilience of container terminal operations. This research contributes to the growing body of knowledge on simulation and optimisation in port logistics and provides actionable tools for decision-makers facing complex operational challenges in maritime transport systems.

**Acknowledgments**

Content produced within the scope of the Agenda “NEXUS - Pacto de Inovação – Transição Verde e Digital para Transportes, Logística e Mobilidade”, financed by the Portuguese Recovery and Resilience Plan (PRR), with no. C645112083-00000059 (investment project no.º 53).

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# OC 7. Real-Time Detection of Driver Fatigue Using Mobile Device Sensors and Artificial Intelligence On-Device

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**Abstract**

Driver fatigue is a leading contributor to road accidents worldwide, particularly due to its impact on cognitive performance and reaction time [1]. While high-end commercial vehicles have adopted Advanced Driver Assistance Systems (ADAS), their limited accessibility in low and middle-income contexts demands cost-effective alternatives [2]. This research presents a smartphone-based driver monitoring system that leverages embedded sensors and on-device Artificial Intelligence (AI) to detect fatigue indicators in real-time. Unlike approaches relying on physiological sensors [3] or vehicle-integrated systems [4], this work focuses on image-based methods deployable on mobile platforms. The system integrates lightweight machine learning models (Mediapipe and ML Kit) with facial features such as Percentage of eyelid closure (PERCLOS), Eye Aspect Ratio (EAR), Mouth Aspect Ratio (MAR), and head pose, which are widely used in literature as indicators of fatigue-related behaviors [2]. These features are then interpreted using a custom rule-based decision layer for real-time operation. The system was validated using two public datasets, YawDD [5] and DMD [6], and a native Android proof-of-concept application, designed and implemented by the author, which is being evaluated in real-world sessions with multiple participants. During these sessions, simulated fatigue behaviors are monitored using two smartphones running the app and recorded with a separate device for ground-truth video, enabling robust performance analysis across different AI models and devices. Preliminary results are promising, and a more complete analysis will be presented at the conference. This work contributes to intelligent transport safety by demonstrating the feasibility of real-time, non-intrusive fatigue monitoring using only smartphone-based technology.

**Acknowledgments**

This work is supported by the Faculty of Engineering of the University of Porto as part of a Master's Thesis in Informatics and Computing Engineering. The author thanks Professor António Pimenta Monteiro (academic supervisor) and Bruno Correia (industry supervisor) for their guidance throughout this research.

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# OC 8. Segmenting the Intermodal PT Traveler: A Psychometric and Behavioural Study in Porto Metropolitan Area

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**Abstract**

As a consequence of the several negative externalities associated with car usage, there is a growing pressure to promote more sustainable mobility habits through supporting transport alternatives. An increasingly attractive solution is the concept of intermodal mobility, i.e., the combination of different modes of transport in a single trip, leveraging the strengths of each mode to provide a more sustainable and efficient transport option.

Despite its potential, research on intermodal mobility remains limited, with studies focusing on the travel behaviour of intermodal users being especially rare. However, to gain a comprehensive understanding of intermodality and its potential role in promoting sustainable mobility, it is crucial to explore the intermodal travel behaviour from the user's point of view, including their patterns and motivations.

Accordingly, the goal of this study was to analyse the travel behaviour of intermodal users, focusing particularly on those that combine public transport (PT). Using a representative mobility survey conducted by the Portuguese National Statistics Institute to the Porto Metropolitan Area (IMob17), we have identified and characterized distinct profiles of intermodal PT users through marketing segmentation.

The market segmentation analyses have revealed two profiles of intermodal PT users based on their motivations and perceptions of using PT (i.e., psychometric segmentation) and four profiles based on their main modes of intermodal travel (i.e., behavioural segmentation). Notably, a connection between the psychometric and behavioural segments has been found: choice riders are significantly more likely to use rail options such as metro and train, while captive riders are much more dependent on buses. These findings hold significant policy implications for the promotion of intermodal PT systems, including by highlighting the competitiveness of rail against the private car and the reliance of the most socially disadvantaged groups on the bus.

**Acknowledgments**

This work is a result of Agenda "AET – Alliance for Energy Transition", nr. C644914747-00000023, investment project nr. 56, financed by the Recovery and Resilience Plan (PRR) and by European Union - NextGeneration EU.

# OC 9. Evaluating Systematic Literature Reviews by DSAIVE - Dynamic Systematic Artificial Intelligence Vector Engine

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**Abstract**

The rapid expansion of information production presents a growing challenge in identifying high-quality, relevant studies necessary for a solid research foundation of Systematic Literature Reviews (SLR). In 2021, "Pathways to Net Zero: The Impact of Clean Energy Research" from Elsevier's Analytical Services, publications in Lithium Alloys | Secondary Batteries | Electric Batteries accounted for over 7% of the total, the largest report topic cluster [1]. Recently, former CEO of Stellantis Carlos Tavares questioned the Internal Combustion regulation imposed on electric vehicles, claiming that it did not consider the social dimensions and impacts [2]. Paradoxically, in an era that proposes endless data and powerful AI, making well-informed decisions are yet extremely complex, including transparency concerns. Artificial Intelligence (AI) offers significant potential in streamlining literature reviews through advanced analytical techniques, namely semantic search, where keywords may become vector representations that contain contextual meaning. Transport Systems is a particularly rich multidisciplinary area. The search for alternatives to fossil fuels is a particularly challenging theme. DSAIVE framework is as a Dynamic Systematic Artificial Intelligence Vector Engine, proposing AI Retrieval Augmented Generation (RAG) to Improve Literature Review in Multidisciplinary Context. First, the study explores how segmented data ingestion and structured outputs bring relevant granular insights about the studies that are selected for the literature review. Secondly, the study proposes a methodology to create a Ground Truth dataset, which is necessary for the evaluation of the model's output. The results make an important contribution to gaining control and transparency in a highly challenging context of selection of new transport fuels, as it simultaneously calls for holistic and domain-specific knowledge of chemistry, climate change, techno-economic, and behavioral impacts.

**Acknowledgments**

This article is partially supported by - Agenda "H2Driven Green Agenda", nr. C644923817-00000037, investment project nr. 50, financed by the Recovery and Resilience Plan (PRR) and by European Union NextGeneration EU and by FCT PhD Grant ref. 2024.05194.BDANA.

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# OC 10. Optimizing Truck Scheduling at Container Terminals: a Heuristic-Based Approach

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**Abstract**

The continuous growth of maritime trade has increased the pressure on container terminals, requiring a more efficient management of land operations [1]. A critical challenge that these systems have to face is the variability of truck arrival times, which gives rise to periods of congestion alternating with times of underutilization of resources [2]. Current scheduling systems still rely heavily on carrier preferences, with limited coordination with the actual availability of terminal resources. This causes operational inefficiencies and tends to result in lengthy waiting periods.

In this work we have developed a heuristic-based optimization model aimed at improving the scheduling of container collection operations by coordinating both, the carriers and the terminal preferences. The proposed approach is based on a joint consideration of carrier appointments, container locations in the yard, and the dynamic terminal capacity.

The model is expected to be tested on a real use-case, with multiple sources data on the truck appointment preferred time-windows, the storage yard layout, the containers locations, and the terminal available resources. The developed approach will support more informed and faster decision-making regarding the assignment of trucks to time-windows and the pick-up sequence within each time window.

A key contribution of this study lies in the design and deployment of a practical, data-driven optimization tool that enhances the synchronization between external and internal terminal operations, enhancing the scheduling of trucks in containers collection. This model is expected to reduce the waiting times for trucks and congestion periods, to optimize the utilization of terminal resources, and to promote more sustainable and responsive operations.

**Acknowledgments**

This work is co-financed by Component 5 – Capitalization and Business Innovation, integrated in the Resilience Dimension of the Recovery and Resilience Plan, within the scope of the Recovery and Resilience Mechanism (MRR) of the European Union (EU), framed in the Next Generation EU, for the period 2021 – 2026, within project NEXUS, with reference 53.

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# OC 11. Qualitative decision-support approaches for sustainable urban mobility planning: insights from metropolitan case studies

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**Abstract**

This study aims at advancing qualitative decision-support approaches in transport systems research by developing a conceptual framework for collaborative design of sustainable urban mobility transition roadmaps. Through purposeful sampling, the research examines metropolitan governance practices across six international cases: Greater Manchester, Nantes Metropole, Metropolitan City of Bologna, Greater Montreal, Greater Santiago, and Greater Christchurch. The research integrates state-of-practice approaches with theoretical advancements, to create a decision-support tool specifically designed for intermunicipal planning processes that foster meaningful stakeholder and citizen engagement. Grounded in institutionalist constructivism [1] and communicative planning theories [2–4], the research employs qualitative methodologies including semi-structured interviews, document analysis of planning instruments, and qualitative decision-support approaches. This interdisciplinary framework acknowledges the strategic nature of metropolitan mobility planning, focused on establishing action priorities and participatory mechanisms. The developed framework is currently being tested with the Metropolitan Area of Porto, where an intermunicipal workshop conducted in late 2024 is providing valuable insights for refining the approach. As policy-oriented applied research, this study embraces an iterative process of development in this stage, incorporating lessons from research-practice exchanges to enhance the framework's utility for policymakers navigating complex intermunicipal sustainable mobility transitions.

**Acknowledgments**

The first author of this work has received the support of the Portuguese Fundação para a Ciência e a Tecnologia (FCT), of the Ministério de Ciência, Tecnologia e Ensino Superior (MCTES), through grant 2020.09731.BD, under the doctoral scholarship program, within the framework of the Programa Operacional Regional Norte and with the support of the European Commission's European Social Fund, and from INESC TEC, through grant 10808/BI-MED_B2/2024..

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# OC 12. A Conceptual Framework to Guide Horizontal Collaborative Initiatives in Logistics

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**Abstract**

Horizontal collaboration involves strategic alliances between companies that share common activities within the same business sector, aimed at generating benefits for participants and stakeholders. In logistics, companies form alliances by sharing routes, infrastructure, assets, information systems, technologies or human resources, seeking to foster more efficient activities. Logistics companies engaged in horizontal collaborative initiatives pursue multiple objectives, including cost reduction, market expansion, increased load factors, reduced greenhouse gas emissions and enhanced customer service [1]. The literature emphasizes that the success of these partnerships is strongly dependent on careful and accurate planning before operations take place, mainly when participating companies are competitors (a scenario referred to as co-opetition). In such cases, increased complexity arises from challenges related to trust management among rivals, equitable distribution of costs and benefits, information sharing protocols, and compliance with antitrust regulations. This work aims to develop a conceptual framework to define and organize patterns of horizontal collaboration in logistics. The research methodology adopted is based on semi-structured interviews with experts in urban logistics, from both academia and the business sector. These interviews served to deepen concepts, revisit assumptions and add new insights to the research. Moreover, real cases of these partnerships are studied to examine the partnerships in a practical context, comparing partnership management models with the reality of the logistics sector. The proposed framework seeks to structure the needs, expectations and limitations of participants by identifying the necessary inputs for designing a collaborative initiative and is organized as follows: Initially, an analysis of the involved stakeholders is conducted, and participants steer the strategic alignment within the collaboration, emphasizing their objectives, the competitive environment, and the governance model. Next, the strategic planning of the partnership is defined, including the identification of resources to be shared, information-exchange rules, contractual terms, and cost-and-benefit sharing agreements. In practice, the framework will be used to support the development of a detailed business model [2] for partnerships and the identification of the key controllable and uncontrollable variables within horizontal collaboration in logistics.

**Acknowledgments**

This work of the first author was partially funded by Fundação para a Ciência e Tecnologia (FCT), Portugal, through grant PD/BD/142906/2018.

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# OC 13. Synchronization Applications in Public Transport Timetabling: Insights from a Systematic Literature Review

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**Abstract**

Public transport planning comprises a series of sequential tasks carried out at strategic, tactical, and operational levels. At the tactical level, key activities include setting service frequencies and generating timetables. This review focuses on the latter problem. Various methods address the timetabling problem, where synchronization plays a crucial role. Synchronization considers the interconnection of multiple routes within a transport network, aiming to facilitate smooth transfers and support seamless travel experiences. Ultimately, effective timetable synchronization enhances the overall quality of public transport, contributing to a more efficient system and reducing the negative impacts of transfers. This literature review integrates findings and perspectives of synchronization to obtain timetables in public transport. Given the increasing volume of research in this area, the objective is to highlight recent developments and advances in the field. A systematic review is presented, following the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) methodology, which includes studies published over the past five years. This review compares key findings and synthesizes insights from the literature, culminating in a critical analysis of central themes that reveal emerging trends and identify directions for future research.

**Acknowledgments**

This work is a result of Agenda “AET – Alliance for Energy Transition”, nr. C644914747-00000023, investment project nr. 56, financed by the Recovery and Resilience Plan (PRR) and by European Union - NextGeneration EU.

# OC 14. Equity and Efficiency Perspectives in Public Transport Design

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**Abstract**

Addressing longstanding criticisms regarding the neglect of disadvantaged populations in transit planning, the research aims to develop public transit (PuT) systems that balance efficiency with equitable service distribution. Conventional PuT network design (PTND) approaches often fall short in incorporating social equity, despite its critical role in shaping mobility and access to opportunities. To address this, the study leverages demographic and socioeconomic data, identifying transportation needs based on adjusted demand derived from population characteristics and travel behavior patterns. These insights are foundational to designing inclusive rail and bus networks that align with local needs. This study explores the integration of equity considerations into PTND, using the Metropolitan Area of Porto (AMP) in Portugal as a case study. The methodology employs a two-step network design strategy. First, new rail stops are proposed in areas with high captive potential demand, prioritizing regions where transport needs are unmet. In the second step, an integrated bus network is developed under constraints such as population thresholds and distance requirements between stops, ensuring that even sparsely populated or underserved areas receive adequate service. Both networks are integrated to form a cohesive multimodal system. To evaluate the outcomes, the study applies two key assessment tools. Equity is measured using the GINI coefficient, reflecting the fairness of service distribution across the population, meeting their needs. While service adequacy coverage evaluates how well the system serves the population. The study uses Data Envelopment Analysis (DEA) to assess the efficiency of each proposed network design. This involves analyzing the relationship between system inputs (such as infrastructure characteristics and operational frequencies) and outputs (namely equity and service coverage outcomes). The analysis reveals trade-offs inherent in PuT design: while expanding services to marginalized groups enhances equity, it often increases costs or reduces operational efficiency. Findings demonstrate that strategic integration of equity into transit planning can lead to systems that are both inclusive and functionally efficient. By prioritizing accessibility as a social good, the study shows that PTND can better align with broader societal goals, such as reducing transport-related social exclusion and encouraging sustainable mobility. This research contributes actionable insights for transportation planners and policymakers. Ultimately, the framework presented can serve as a reference for future transit developments, highlighting how socially responsive infrastructure planning can transform PuT into a tool for promoting justice and inclusion.

**Acknowledgements**

This work was supported by the Fundação para a Ciência e a Tecnologia (FCT), Portugal, through grant 2020.05098.BD.

# OC 15. Planning road infrastructure interventions using crash prediction models

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**Abstract**

This work presents a methodology for supporting road infrastructure management by identifying road segments in need of safety interventions. By mapping high-risk locations, the proposed methodology enables Ascendi, a Portuguese road concessionaire, to work towards Vision Zero framework by reducing road crashes, namely the ones causing serious injuries or death. The approach reinforces proactive safety management and aligns with best practices adopted in the European Union for road safety evaluation. The methodology combines historical crash data from 9-year records with road crash predictive models, using count data models (Poisson or Negative binomial regressions) to estimate expected road crashes. These models encompass a set of explanatory variables collected through Ascendi's integrated information systems, including Annual Average Daily Traffic (AADT), cross section, maximum speed limit, tolls, etc. The proposed work considers a set of safety indicators and maps hotspots by combining different methods for the identification of hazardous sites, namely the crash frequency (CF) method and the potential for improvement using predicted crashes (PI). While the CF maps hotspots by solely using the absolute frequency of crashes, the PI compares the actual number of crashes recorded over the last three years with the predicted values generated by the models. The segments where the real number of crashes significantly exceeds the predicted values are flagged as high risk and categorized as a crash accumulation zone. These high-risk segments are further analysed using data-driven safety indicators, including total and injury crash counts, crash severity index, and traffic-adjusted crash rates. This identification process is supported by an interactive dashboard, which enables stakeholders to explore and compare both historical and forecast data from both methods. The resulting tool allows for both aggregated and disaggregated analyses, by filtering by concession, motorway, section (between interchanges) and segment. The system not only identifies high-risk segments but also supports crash forecasting by allowing users to input expected traffic growth for future scenarios. This dual capability provides support for the planning and implementation of Road Safety Action Plans.

**Acknowledgments**

The authors thank Ascendi for the provided data and feedback.

# OC 16. Explainable Blackboard Architecture for User-Centered Route Recommendations in Active Mobility

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**Abstract**

The Blackboard Architecture (BBA) is a modular, opportunistic AI framework that coordinates multiple knowledge sources (KSs) to solve complex problems [3,5]. Though versatile in fields such as medicine, urban planning, and cybersecurity, BBA lacks inherent explainability, unlike traditional expert systems that have built-in justification modules [1]. This limitation impairs user trust and transparency. This work proposes the integration of an Explainable Artificial Intelligence (XAI) module within the BBA to generate interpretable and personalized route recommendations for active mobility users. The approach leverages domain-specific ontologies to model relationships between urban features (e.g., lighting, noise, green areas) and user-centered indicators of comfort and safety [2,4]. The XAI module translates logical inferences and feature attributions into natural language using NLP techniques. Explanations are generated using dynamically populated rule-based templates with SHAP values, SPARQL-based ontology queries for contextual definitions, and counterfactual reasoning (e.g., "This route would be safer with better lighting"). These transparent explanations allow users to compare routes based on their needs and better understand the system's reasoning. The current version of our work is still in an early stage of implementation. However, as we progress in the development of the system, we test each module and validate the effectiveness of the framework. We further refine its capacity to deliver transparent, user-centered route recommendations based on perceived comfort and safety. The explainability of the system goes side by side with the developments made.

**Acknowledgments**

This work was partially supported by the Portuguese Recovery and Resilience Plan (RRP) of the European Union (Next Generation EU), through project no. 56, Aliança para a Transição Energética (ATE), proposal no. C644914747-00000023.

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# OC 17. Reconciling safety, energy efficiency and operations towards the integration of truck platooning in the freight transport ecosystem

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**Abstract**

Truck platooning (TP) is a promising technology that enables the coordinated circulation of heavy vehicles in close proximity, supported by advanced automation and vehicle-to-vehicle communication systems. The anticipated benefits of TP include improved energy efficiency, enhanced road safety, and streamlined logistics operations. However, despite its technological maturity in controlled settings, several challenges remain regarding its real-world deployment, especially regarding human factors, operational integration, and stakeholder acceptance [1,2].

This doctoral research aims to address these challenges through a multi-phase, simulation-based study. The work will investigate the trade-offs between inter-vehicle distances, automation levels (L2–L5), and their combined effects on safety and energy efficiency. High-fidelity driving simulators will be used to replicate critical TP scenarios, such as control transitions and interactions with mixed traffic, to identify safe and efficient configurations. These findings will inform energy consumption models and support the development of a collaborative logistics framework that facilitates the adoption of TP among freight operators.

Building on previous work developed under the TRAIN project, this research extends the scope from technical simulation to operational impact and adoption strategies. A set of performance indicators will be developed to assess TP's implications for fleet coordination, infrastructure use, and benefit-sharing mechanisms [3]. The aim is to contribute practical guidance for the structured, scalable, and socially acceptable integration of TP into freight transport.

This approach delivers both scientific insights and applied outcomes, supporting a safer, more sustainable, and collaborative freight system in line with the European Green Deal, the Vision Zero strategy, and the broader digital and green transition in mobility.

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# OC 18. The Critical Factors for Collaboration in Last-Mile Logistics

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**Abstract**

The rapid growth of e-commerce has significantly intensified the demands on the logistics systems, especially in last-mile delivery. This has led to new challenges and environmental concerns that must be urgently addressed. In this context, collaboration in last-mile logistics has emerged as a potential solution, sparking cross-sector interest. However, collaboration in e-commerce-induced last-mile logistics remains largely unexplored in both research and practice. To address this issue, there is a need for a theoretical framework that consolidates existing knowledge and invites the development of new collaborative last-mile strategies. Accordingly, drawing on typologies on broad supply chain collaboration, typologies specific to collaboration in last-mile logistics, and insights from exploratory last-mile studies identified through a Systematic Literature Review, this study aims at a balance between the foundational collaboration principles and the specific conditions and needs of last-mile logistics. Therefore, this study identifies the critical factors necessary for effective and sustainable collaboration in last-mile logistics. By doing so, this study supports the development of different collaborative arrangements in last-mile logistics, ranging from inter-courier partnerships to consumer-based collaboration.

**Acknowledgments**

Vasco Silva thanks the Portuguese Foundation for Science and Technology (FCT) for the studentship 2023.01212.BD. Tânia Fontes thanks the project with application reference 2022.07805.CEECIND.

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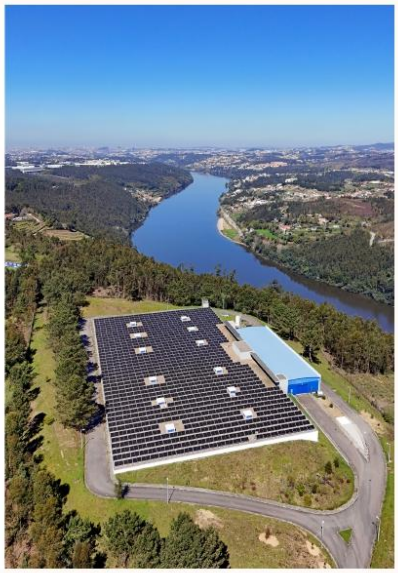


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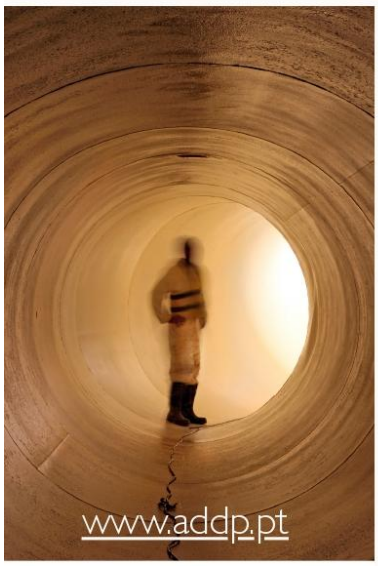

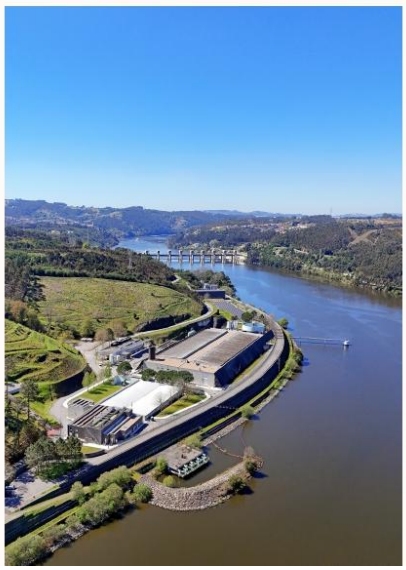


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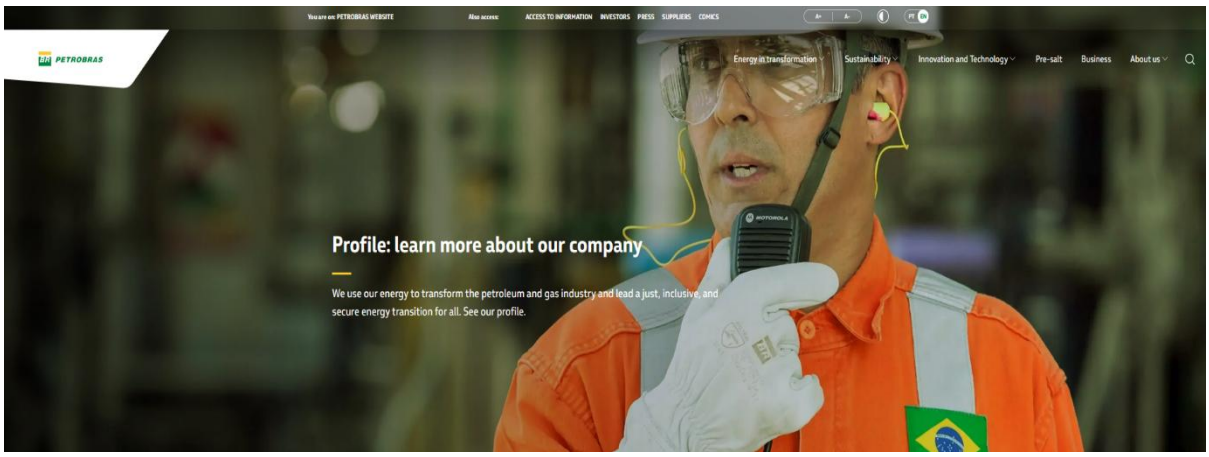


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**Gas and Energy (G&E)**

It covers the activities of logistics and sale of electric energy and natural gas, as well as the generation of energy through thermoelectric plants. It also includes natural gas processing and fertilizer operations, and our interests in NG transport and distribution companies in Brazil and abroad.

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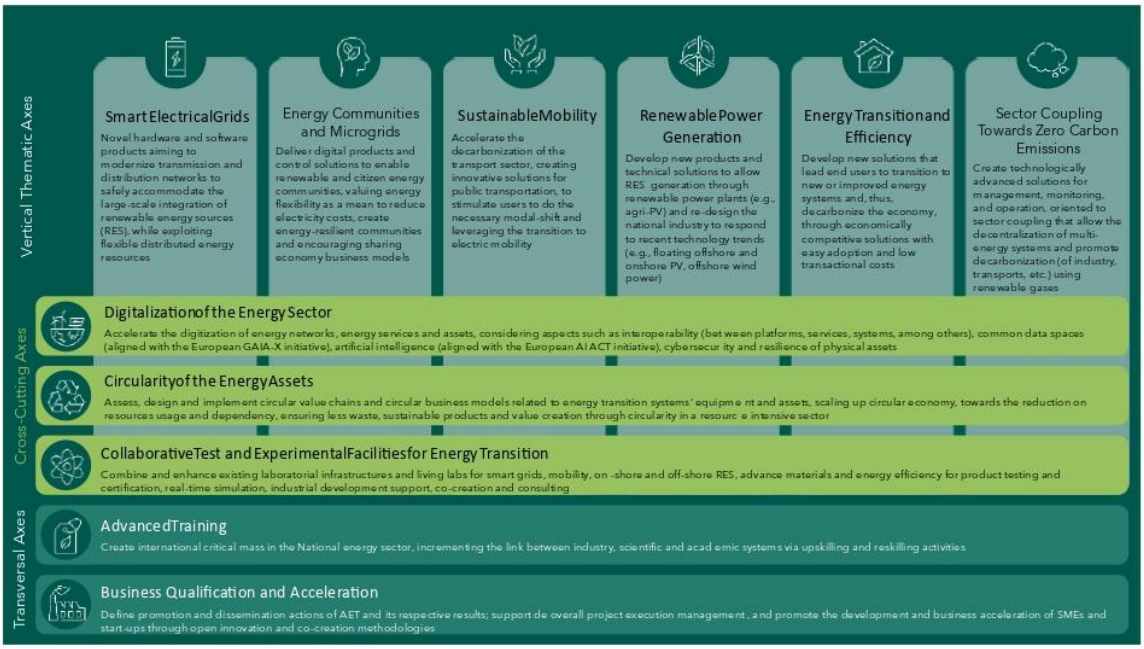
The Alliance for Energy Transition (ATE) is one of the largest Mobilizing Agendas funded by the Portuguese Recovery and Resilience Program (PRR) and was created to strengthen the competitiveness and resilience of the national energy value-chain, particularly in sight of innovative export-oriented product/service development and consolidation.

This strategic goal is being achieved through a sustained series of strategic objectives, including an increase of goods and services exports, higher investment in R&D and reduction of $CO_2$ emissions, by allocating a total investment of 274 M€ in added-value activities that are generating around 46 new products and services. This objective is only possible due to the commitment of a total of 58 companies and public entities and 19 Research & Innovation (R&I) centers and universities, indeed crucial to structure an entire ecosystem aiming at energy transition. Furthermore, the ATE promotes the creation of about 700 qualified jobs.

ATE proposes a comprehensive plan for the Portuguese energy transition, based upon the experience and strategic vision of the various players in the energy sector that operate both national and internationally, which results in the creation of a structural ecosystem without precedents for the national energy sector. In this context, 11 thematic axes were defined:




ATE is led by EFACEC ENERGIA, involving organizations with complementary expertise from the research and industrial areas across Portugal. The strong relationship between the scientific and industrial entities in ATE is one of the key distinctive factors of the consortium. National R&I institutes and collaborative laboratories work together with some of the most prominent industrial partners to address market needs. The synergies that are part of ATE enhance the success of all the consortium's initiatives as science is brought together with industry to solve needs and challenges of the energy sector. By covering the whole energy value chain, ATE has a unique positioning in the Portuguese panorama, in a domain that is of utmost relevance as energy impacts the whole economy.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Start Date | 01-04-2022; End Date | 30-06-2026; Total funding amount| 104 113 760,36€

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PPS03 - REDUCE - REDesigned sUstainable ContainErs and pallets

PPS04 - New glass containers for food and beverage products more sustainable

PPS05 - New Co-Injection process for manufacturing plastic packaging incorporating recycled materials

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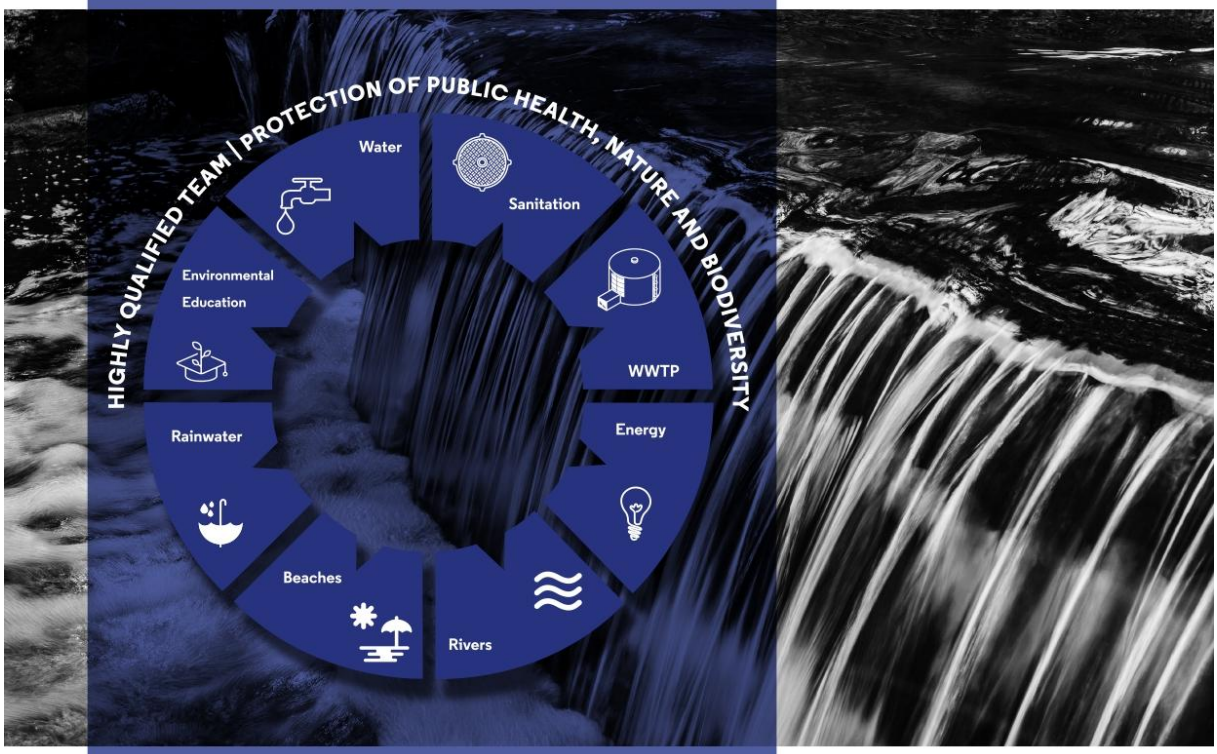


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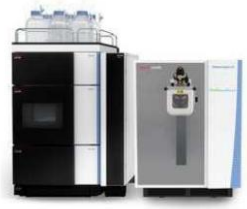

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Association CECOLAB – Collaborative Laboratory Towards Circular Economy is the Collaborative Laboratory (CoLAB) for the Circular Economy, headquartered in Oliveira do Hospital in the central interior region of Portugal. With more than 40 highly qualified human resources, through specialized research, we develop sustainable market solutions in a model of CIRCULAR ECONOMY for strategic value chains of the Portuguese economy and with high international impact. We provide innovation management Consulting services high quality advice and transfer knowledge to the MARKET.

In addition, we cordinate the Portuguese Strategic Research Network in Circular Economy (Order No. 4157/2019).


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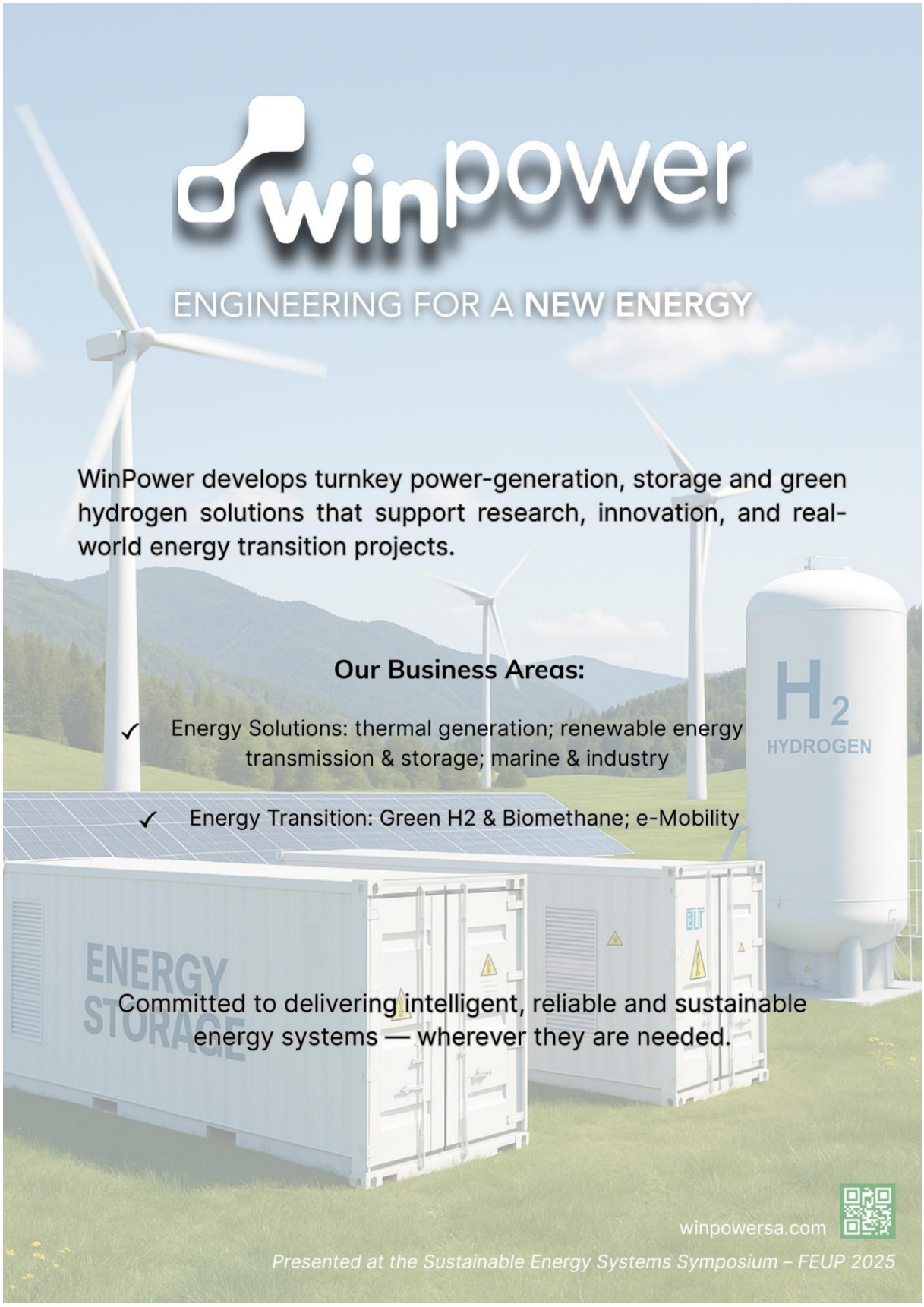
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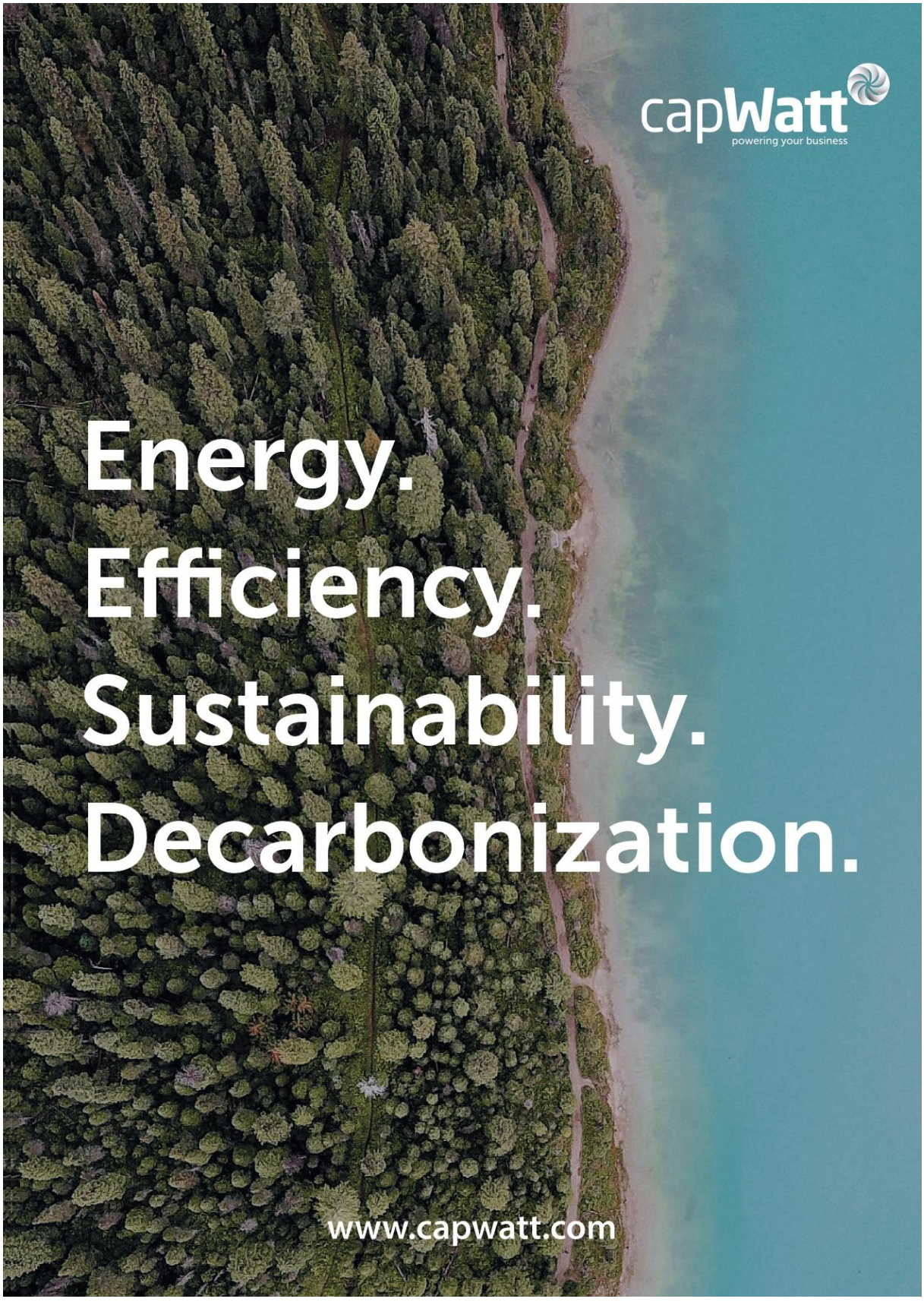
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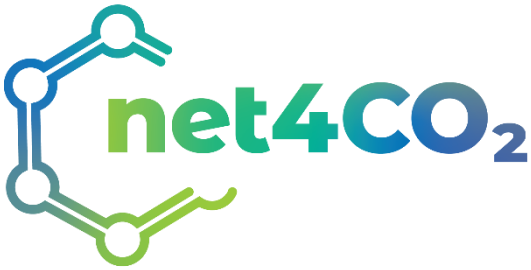


Climate change is one of the most urgent challenges facing humanity, placing significant strain on both society and the environment. In response, **CoLAB Net4CO2 is committed to advancing innovative decarbonization solutions that bridge scientific research with real-world market applications**. The institution focuses on accelerating the development and deployment of competitive, disruptive technologies for $CO_2$ capture, utilization, and storage, contributing to a more sustainable and resilient future for both society and the planet.

CoLAB Net4CO2's work centers on economically viable decarbonization through cutting-edge technologies. These include capturing and separating $CO_2$ from industrial combustion gases, converting $CO_2$ into valuable products such as synthetic fuels, chemicals, and construction materials, and enabling $CO_2$ transportation and geological storage. By developing integrated solutions across various industrial sectors in Portugal and Europe, CoLAB is positioning itself as a key player in decarbonization efforts. The institution also plays a vital role in shaping regulatory policies that support the adoption of CO2 reduction technologies.

CoLAB is involved in a range of initiatives, including the **engineering and construction of pilot prototypes** for $CO_2$ capture and valorization, as well as providing **consulting services** to industries seeking to reduce their carbon footprint. Its engagement in national and international R&D projects ensures it remains at the forefront of innovation. CoLAB also organizes and participates in **advanced training programs** to raise awareness and deepen understanding of $CO_2$ capture, utilization, and storage (CCUS), ensuring the next generation of professionals is equipped to tackle climate change.

The institution is committed to **scientific dissemination**, publishing research, attending national and international conferences, and hosting outreach events to share its findings with the broader scientific community and the public. CoLAB's collaborative approach extends to partnerships with academia, industry, and policymakers, driving innovation and ensuring meaningful impact in decarbonization efforts across Europe and beyond.

CoLAB Net4CO2 is deeply invested in **developing highly skilled professionals** in decarbonization. The center offers numerous opportunities for PhD students, MSc candidates, and early-career researchers to engage in internships, thesis projects, and hands-on research, providing invaluable experience in a dynamic environment. CoLAB also runs internal and external training programs that enhance professional development, further solidifying its leadership in the transition to a low-carbon economy.

For students passionate about addressing climate change, CoLAB Net4CO2 offers an inspiring and impactful environment where they can contribute to meaningful solutions, gain expertise in cutting-edge technologies, and shape the future of sustainable practices and policies.

ARCP CoLAB

REDE DE COMPETÊNCIA EM POLÍMEROS


# Research to Innovate Create to Produce

## Presentation

ARCP – Associação Rede de Competência em Polímeros (Polymer Competence Network Association) was founded on February 26th, 2007, with the aim of overcoming the challenges of conducting joint research between universities and industry, and of enhancing the use of emerging knowledge. In 2022, it was granted the title of CoLAB – Collaborative Laboratory by the FCT (Portuguese Foundation for Science and Technology).

Combining the expertise of its members, ARCP's activity enables cutting-edge developments not only in the creation and optimisation of new products and processes, but also in more fundamental research.

As such, ARCP positions itself as a shared workspace where members carry out research and development (R&D) projects in a coordinated and interactive way. It stands as a Centre of Excellence in polymer science and technology, with the main goal of promoting innovation and increasing competitiveness.

New Business
Development & Research Center
创新业务发展与研究中心

**CTGI New Business Development & Research Centre (CTGI NBDRC)**
*A Strategic Innovation Hub of China Three Gorges Corporation*

Located in **Lisbon, Portugal**, the **CTGI New Business Development & Research Centre** represents China Three Gorges Corporation's (CTG) commitment to driving the global energy transition through cutting-edge R&D, cross-continental collaboration, and sustainable innovation.

**Our Mission:**

To bridge CTG's know-how with European R&D excellence, enabling innovation that scales, serving real business needs, producing demonstrable outcomes, and generating long-term value.

**Our Vision:**

To lead CTG's R&D activity across six strategic domains: 1) Business Origination; 2) Technical Operation; 3) Asset Management; 4) Digital Transformation; 5) Technology Research and Validation; 6) Environmental, Social and Governance.

**Why CTGI NBDRC?**

✓ Co-creation with European entities for projects with real impact within CTG's operation;
✓ CTG's group >120 GW clean energy portfolio (including >2 GW in Spain);
✓ Strategic positioning at the intersection of China, Europe, and South America.

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