PamplonaTech 2025

Artificial Intelligence & Optimization International Workshop

Public University of Navarre, Pamplona, Spain

September 25-26, 2025

The areas of Artificial Intelligence, Data Science and Optimization enable the efficient and sustainable digitization of our business, industrial, educational, and social sectors. In collaboration with the Universidad Pública de Navarra, we are organizing the PamplonaTech Artificial Intelligence & Optimization workshop. The event, will be held in Sala Nicolás García de los Salmones (Olivos Building), in Campus Arrosadia, Pamplona, Spain on 25 and 26 September 2025.

To encourage applied research and knowledge transfer, this workshop enables direct engagement between experts from universities and industry. I t explores collaboration in research and development, and highlights ongoing projects that stem from academia-industry partnerships.

Program at a glance

September 25th, Thursday	
8:00 8:30	Registration
8:30 9:00	Opening session
9:00 10:30	Lectern session *Logistics, Transportation & Smart Systems*
10:30 11:00	Coffee break
11:00 12:00	Keynote – Humberto Bustince *Five Hidden Challenges of Generative AI*
12:00 13:00	UPNA predoct session *Young Researchers from UPNA*
13:00 14:30	Lunch
14:30 15:30	Keynote – Bartosz Sawik *Securing Space: Cybersecurity & Resilience in Supply Chains*

September 26th, Friday	
Registration	8:30 9:00
Keynote – Helena Ramalhinho *Optimization for Social Impact: Efficiency in the Service of Equity*	9:00 10:00
Coffee break	10:00 10:30
Lectern session *Tools for Sustainable & Resilient Supply Chains*	10:30 12:30
Closing session	12:30 13:00
Lunch	13:00 14:30

September 25, 2025

8:00 – 8:30 Registration

8:30 – 9:00 Opening session

9:00 – 10:30 Lectern session: Logistics, Transportation & Smart Systems.

Session Chair: Raquel Soriano

- A Multi-Neighborhood Search Approach to Rolling Stock Rescheduling. *Roberto Rosati (WU Vienna University of Economics and Business)*
- Using Transformers and Reinforcement Learning for the Team Orienteering Problem Under Dynamic Conditions. *Yangchongyi Men (Universitat Politècnica de València)*
- Optimizing Maintenance of Energy Supply Systems in City. *Antoni Guerrero (Baobab Soluciones)*
- A Biased-Randomized Variable Neighborhood Search Algorithm for the Non-Smooth Electric Vehicle Routing Problem with Soft Time Windows. *Marc Escoto (Universitat Politècnica de València)*
- Necessary integration of glass in the optimization of Intercompany Transportation. *Raquel Soriano (Universitat Politècnica de València)*

10:30 – 11:00 Coffee Break

11:00 – 12:00 Keynote session

Session Chair: Javier Faulín

- Five problems with generative artificial intelligence. *Humberto Bustince (Universidad Pública de Navarra)*

12:00 – 13:00 UPNA predoctoral session

Session Chair: Adrian Serrano

- A journey through a Doctoral Thesis on Low Environmental Impact Vehicles and Operations Research. *Irene Izco (Universidad Pública de Navarra)*
- Optimization Models and Collaborative Economy Approaches for Sustainable Last-Mile Distribution. *Alisson García (Universidad Pública de Navarra)*
- A state-of-the-art review of aerodynamic improvements applied to road freight transport. *David Moreno (Universidad Pública de Navarra)*

13:00 – 14:30 Lunch

14:30 – 15:30 Keynote session

Session Chair: Carles Serrat

- Multi-Criteria Optimization for Cybersecurity Risk Management in Space Mission Supply Chains. *Bartosz Sawik (AGH University of Krakow)*

September 26, 2025

8:30 – 9:00 Registration
9:00 – 10:00 Keynote session
Session Chair: Angel Juan
Optimizing Social Impact: Enhancing Efficiency and Equity. *Helena Ramalhinho (Universitat Pompeu Fabra)*
10:00 – 10:30 Coffee Break
10:30 – 12:30 Lectern session: Tools for Sustainable & Resilient Supply Chains
Session Chair: Rosa Ríos
CEMI Project Outcomes and Beyond: From OperationsOptimizer to Future Directions in AI-Assisted Optimization. *Javier Pernas (Universidade da Coruña)*
Wood Supply Chain Optimization Toolkit, a first working version for the Wood2Wood EU Project. *Javier Cuartas (Universitat Politècnica de València)*
Object Detection with ADAS Camera and Radar in Virtual Testing Environment. *Antonio Iriondo (NAITEC)*
A Learnheuristic Algorithm for Context-Aware and Multi-Period Dynamic Pricing. *Verónica Medina (Universitat Politècnica de València)*
Optimizing Multi-Depot Vehicle Routing Under Dynamic Demand Conditions using a Learnheuristic Approach. *Wenwen Chen (Universitat Politècnica de València)*
Study of Automatic Parcel Lockers Networks in A Coruña. *Rosa Ríos (Universidade da Coruña)*
12:30 – 13:00 Closing Session
13.00 – 14:30 Lunch

Keynote sessions

Five Problems with Generative Artificial Intelligence. ***Humberto Bustince (Universidad Pública de Navarra)***

September 25, 2025, 11:00- 12:00

We are living through a revolution driven by the rapid developments in generative artificial intelligence. However, some of the challenges in this field are far less known and discussed. The objective of this talk is precisely to highlight five of the main problems surrounding this technology, not only from a technical perspective but also from a social one. In particular, we will consider aspects that are often hidden behind the headlines, such as privacy risks, biases, and environmental costs, which should be considered to make a proper assessment of the capabilities of deep learning techniques.

Humberto Bustince Sola is a full professor of Computer Science and Artificial Intelligence at the Public University of Navarra and honorary professor at the University of Nottingham since 2017. He has published over 300 works (around 120 in Q1 journals), introducing key concepts in data fusion and uncertainty handling in AI, such as ignorance functions, overlap functions, admissible orders, CF-integrals, preaggregations, and d-integrals. He collaborates with leading research groups worldwide and serves as editor-in-chief of Mathware & Soft Computing and Axioms, as well as on the editorial boards of Fuzzy Sets and Systems, Information Fusion, and the International Journal of Computational Intelligence.

Multi-Criteria Optimization for Cybersecurity Risk Management in Space Mission Supply Chains. ***Bartosz Sawik (AGH University of Krakow)***

September 25, 2025, 14:30- 15:30

Space mission supply chains are increasingly complex and digitally interconnected, making them highly susceptible to sophisticated cyber threats. Ensuring cybersecurity in these environments is a multidimensional challenge that requires balancing competing objectives such as cost, performance, resilience, and risk exposure.

This talk presents a multi-criteria optimization framework for cybersecurity risk management in space mission supply chains, enabling informed trade-off analysis across diverse operational and strategic goals. The proposed approach integrates cyber threat modeling, system vulnerability assessment, and mission impact analysis to quantify risk and evaluate mitigation strategies. Conditional Value at Risk (CVaR) is employed as a tail-sensitive metric to capture the potential impact of rare but high-consequence cyber events. By embedding CVaR into a multi-objective decision model, we enable optimization across multiple criteria, such as minimizing expected loss, maximizing system availability, and limiting budgetary overhead.

A case study is presented using a representative supply chain scenario, demonstrating how this framework supports decision-makers in identifying robust cybersecurity strategies that balance risk tolerance with operational priorities. Results reveal that optimal solutions vary significantly depending on the weighting of mission-critical objectives, highlighting the importance of a customizable, data-driven approach. This work advances the state of cybersecurity risk assessment for space missions by introducing a rigorous, multi-dimensional optimization framework tailored to the unique constraints and risks of the space domain.

Dr. Bartosz Sawik is a Professor at AGH University of Science and Technology in Krakow, Poland. He currently serves as the Associate Dean of Research (Vice-Dean for Science) at the Faculty of Space Technologies and is the head of the Multi-Criteria Optimization for Space Applications research group. Additionally, he is a Visiting Researcher at the University of California, Berkeley. Dr. Sawik holds a Ph.D., M.Sc., and Eng. in Operations Engineering, each earned with honors, from AGH University. His research expertise encompasses multi-criteria optimization, mixed-integer programming, green vehicle routing, supply chain resilience, cybersecurity optimization, and the deployment of automated parcel lockers, among other areas. His recent work includes optimization models for space mission logistics, which balance risk, sustainability, and supply chains, as well as cybersecurity investment strategies using mixed-integer programming. His other contributions include models for healthcare service assignments, portfolio optimization under risk constraints, and weighted-sum approaches to healthcare optimization. Dr. Sawik has participated in numerous national and international research projects, both as Principal Investigator and Investigator. He also advises Ph.D. students and serves as an expert for major Polish research agencies, including NCBiR and PARP. Furthermore, he represents NCBiR on the supervisory board of the Bridge-Alpha investment fund.

Optimizing Social Impact: Enhancing Efficiency and Equity. ***Helena Ramalhinho (Universitat Pompeu Fabra)***

September 26, 2025, 9:00- 10:00

Optimization plays a vital role in generating social impact by enabling the efficient allocation of resources, supporting better decision-making, and increasing the effectiveness of various initiatives. In sectors such as healthcare and social services, the use of optimization techniques can lead to significant cost savings, improved utilization of resources, higher satisfaction among personnel and service users, and—most importantly—ensures that limited resources are directed to those who need them most. Ultimately, this fosters a more equitable and sustainable society.

In this talk, we will introduce optimization tools grounded in mathematical modeling, algorithmic methodologies, and metaheuristics, with a focus on their application to Social Care Services. We will showcase real-world implementations involving organizations such as *Banc del Moviment*, *Suara*, and the *Barcelona City Council*.

The presentation will highlight specific applications, including:

- Logistics and scheduling for in-home social and healthcare services
- Optimization of assistive technology service delivery
- Mobility solutions for social care provision
- Optimization of shared door-to-door transportation for people with disabilities

We will discuss the mathematical programming models and metaheuristic algorithms used in these cases, emphasizing the unique challenges and considerations of applying these tools in social care compared to more traditional domains such as manufacturing and retail.

Helena Ramalhinho Lourenço is a Full Professor at the Economics and Business Department at the University Pompeu Fabra, Barcelona, Spain. She has a B.A. and Master degree in Statistics and Operations Research from the Faculty of Sciences of the University of Lisbon, Portugal, and a Ph.D. in Operations Research from Cornell University, New York, USA. She has been involved in different research projects and consulting for business firms in the area of Operations Research and Logistics. Helena has published many articles in prestigious international scientific journals, and she has presented her work at international congresses and conferences. Helena teaches at various undergraduate, master's and PhD's programs at UPF and other universities. She is currently the director of the Business Analytics Research Group. Her research interests include Operations Research, Scheduling, Combinatorial Optimization, Metaheuristics, Iterated Local Search, Heuristic Search Optimization, Vehicle Routing, and applications on Supply Chain Management, Logistics, Operations Management and Health Care. Currently, Helena is the Vice-rector (Vice-president) for Internationalization of the UPF.