EULiST
Global Conference
2025

“Co-creating Sustainable Solutions for Climate-Resilient Societies”

20th and 21st November 2025

Madrid
Aranjuez Campus

Universidad Rey Juan Carlos

EULiST
EUROPEAN UNIVERSITY

Universidad
Rey Juan Carlos

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EULiST
Global **Conference**

“ Co-creating Sustainable Solutions
for Climate-Resilient Societies **”**

20th and 21st November 2025

Universidad Rey Juan Carlos
Madrid Aranjuez Campus

EUROPEAN UNIVERSITIES
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National Technical University of Athens

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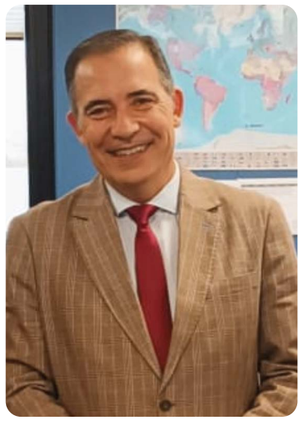
1. Welcome



Dear Participants,

It is with great pleasure that we welcome you to the first EULiST Global Conference, a landmark event organised by Task 5.3 “EULiST Beyond Europe” within the framework of the EULiST Alliance. This highly anticipated conference takes place from 20th to 21st November 2025, at Rey Juan Carlos University (URJC), specifically at the Aranjuez campus. The gathering is held under the inspiring theme: “Co-Creating Sustainable Solutions for Climate-Resilient Societies”.

The primary aim for this conference is to foster a vibrant platform for international knowledge exchange and collaboration. We are committed to building and strengthening partnerships between European and non-European institutions, thereby encouraging fruitful dialogue on pressing global challenges and advancing scientific cooperation on a worldwide scale.

The structure of the conference has been thoughtfully designed to maximise engagement and depth of discussion. Participants will benefit from a mix of parallel sessions—allowing for in-depth exploration of specific subject areas—and plenary sessions, which will bring together all attendees for collective dialogue and reflection. The selected topics for this year’s conference, with more than 70 speakers, include:

> Knowledge Through Research
> Industrial Partners as Vectors of Transformation
> Urban Resilience and Climate Neutrality
> Information and Society

In addition, a dedicated pre-conference session for PhD students and young post-doctoral researchers is being held on 19th November. This initiative reflects our ongoing commitment to supporting the next generation of academics and fostering their professional growth within the EULiST community.

We trust that your participation in this conference will be both enriching and inspiring, offering plenty of opportunities to exchange knowledge, establish new collaborations, and help shape resilient societies for the future. Looking ahead, we are already planning the second EULiST Global Conference, which will be hosted by the National Technical University of Athens (NTUA) in 2027.

We wish you a stimulating and rewarding conference experience in Aranjuez and look forward to your valuable contributions!

Warm regards,
The EULiST Global Conference Organizing Committee

Pablo T. Salvadores Alonso
Chair of EULiST Global Conference Organizing Committee
Director of Internationalization at URJC

2. Venue and Programme

AGENDA - 19th November

ONLINE EVENT | Pre-conference for Phd students (and Postdocs within 2 year after obtaining PhD)

19th November

13:00 **Welcome to the pre-conference.** Organisers: Kerstin Johansen (JU), M. Benedetta Mattei (UNIVAQ)

13:10 **"Research for Impact: Empowering Early-Career Researchers to Shape Climate-Resilient Futures"**

- Kateryna Kryzhanivska (LUT)

13:25 **Question and discussions with the keynote speaker**

13:35 **Parallel session introduction**

13:40 **Themes based on the EULiST Fridays for Research. Each track starts their presentations which are coordinated by one chair**

Track 1. Renewable energy systems: hydrogen, renewable energy sources, storage solutions, societal impacts

This session covers: hydrogen economy, storage technologies (including underground storage), fuel cells, electrolyzers, hydrogen carriers, renewable energy integration, electricity markets, LCA, and social dimensions of the hydrogen transition.

Moderator: Andrea Di Carlo (UNIVAQ)

Speakers:

- **Armando Vitale (UNIVAQ)** - "Experimental assessment of a 100 kWth dual bubbling fluidized bed biomass gasifier integrated with catalytic hot gas cleaning"
- **Alejandro Pérez Domínguez (URJC)** - "Green hydrogen production by solar thermochemical water splitting with non stoichiometric oxides"
- **Barbara Malsegna (UNIVAQ)** - "Hydrotalcite-Based Sorbents for green hydrogen production with simultaneous capture and separation of CO2 by Sorption-Enhanced Water-Gas Shift"
- **Sanni Sipinen (LUT)** - "Electrifying stories: The economy, the environment and global change in news **media discourse on the developing Finnish battery industry"**
- **Pantelis Manakas (NTUA)** - "Comparability Index among LCA studies"
- **Ting Pan (BUT)** - "Renewable Heating and Power Systems for Low-Carbon Residential Energy Transition"

Track 2. Innovations in advanced materials and smart manufacturing for Sustainable Industry 4.0

This session includes: advanced and additive manufacturing, hybrid and micro machining, surface modification processes, green and smart manufacturing, advanced materials, AI-driven product realization, predictive maintenance, supply chain optimization, and Industry 4.0 applications.

Moderator: to be confirmed (JU)

Speakers:

- **Simon Fetzel (STUBA)** - "Robot Imitation Learning from Videos for small scale production"
- **Lotfi Makhlouf (IMT)** - "Hybrid Additive Manufacturing for Agile and Sustainable Tooling: The AGILITY Project"
- **Meysam Norouzi Inallu (LUT)** - "Effect of laser powder bed fusion parameters on the functional properties of Ni-Mn-Ga magnetic shape memory alloys"
- **Michal Križo (STUBA)** - "Mycelium-Based Composites and Digital Fabrication: Exploring New Pathways for Sustainable Architecture"
- **Ilias Theodoropoulos (NTUA)** - "Developing an Integrated Management and Evaluation Standard for Megaprojects across their Spatial Life Cycle"

CLIC HERE
ONLINE EVENT

Track 3. Climate change, environmental resilience, and green urban transitions: technologies and strategies for a sustainable future

This session integrates: climate adaptation and mitigation, disaster risk reduction, biodiversity and ecosystem resilience, sustainable urbanization, green cities, deforestation, water management, and the socio-economic impacts of climate change, including health and societal resilience.

Moderator: to be confirmed (UNIVAQ)

Speakers:

- **Angeliki I. Chronopoulou (NTUA)** - "Climate Crisis and existing buildings' resilience: The Athenian Polykatoikias of the period 1920 – 1960"
- **Raghad Awad (STUBA)** - "Green Infrastructure for Climate-Resilient Cities: Pathways Toward Sustainable Urban Futures"
- **Vanessa Tomei (UNIVAQ)** - "Urban Metabolism and connectivity in polycentric urban systems: A Systems- Engineering approach to analyzing the Urban Energy Footprint within Italy's complex settlement pattern"
- **Fernanda Gómez Saenz (LUH)** - "Territorial regeneration and settlement patterns in a rapidly growing Chilean urban agglomeration. The case of Puerto Montt and Puerto Varas"
- **Ivy Londa (LUT)** - "Orchestrating Cross-Sector Collaboration for Regenerative Futures: Success Factors Strategies in Multi-Stakeholder Partnerships"
- **Lenka Pálešová (BUT)** - "Material Flow Analysis as an Approach to Battery Classification for Effective Waste Management: A Case Study in the Czech Republic"

Track 4. Bioengineering, biotechnology, and smart systems for health, mobility, and sustainable communities

This session brings together: biomedical engineering (biomaterials, tissue engineering, neurotechnology, bioinformatics), biocomputing, wearable devices, bioinspired robotics, smart mobility and transportation, e-governance, digital citizenship, smart energy systems, cybersecurity in healthcare, and AI in sustainability and public well-being.

Moderator: Ioanna Giouroudi (TUW)

Speakers:

- **Tayyab Rehman (UNIVAQ)** - "Adaptive Multi-Agent Anomaly Detection for Smart Mobility and Sustainable Communities"
- **Rabia Altunay Kan (LUT)** - "Mathematical modeling of biomedical applications and optimization"
- **Neziha Akalin (JU)** - "Safety, Trust, and Transparency in Socially Assistive Robots"
- **Konstantinos Gounaridis (NTUA)** - "The Spatial Dimension of Accessibility: Digital and Technological Tools in the Potential Redefinition of the Means of Achieving Accessibility"
- **Víctor Díaz Mena (URJC)** - "Advanced conductive polymer composites for wearable sensing applications"

14:25 **Short break**

14:45 **Discussions in each track related to the presentations – moderated by a chair**

- Purpose is to summaries 2-4 joint ideas for future collaborations (joint paper writing, mobility activities, research proposal writing, joint educational activities etc)
- Depending on the number of participants – this could be organized by breakout rooms related to each presenter (who in that case will be the moderator)

15:15 **All are welcome to a final summary**

- Short summary of each track – chair (moderator) and participants
- Virtual assessment via a virtual tool / questionnaire (ideas of questions are on the conceptual level)

15:55 **Thank you for a nice session – and goodbye**

16:00 **End of session**

AGENDA - 20th November

20th November

ONLINE EVENT | Pre-conference for Phd students (and Postdocs within 2 year after obtaining PhD)

08:15 Acreditation of participants (entrance hall))

09:00 Official opening (Plenary Main Hall, Basement)

- **Abraham Duarte.** Rector Universidad Rey Juan Carlos.
- **María Luisa García Mínguez.** Deputy Head of Unit, European Commission Education, Audiovisual and Culture Executive Agency (EACEA).
- **Miguel Gómez Herrero.** Aranjuez City Mayor.
- **Pablo T. Salvadores.** Chair of EULiST Global Conference Organizing Committee.

09:30 Family Photo

09:35 Plenary session: sustainability and cities (Plenary Main Hall, Basement)

Moderator: Antonia Lampropoulou. National Technical University of Athens. International Relations Department

- **Bernadette Luger.** City of Vienna. Head of Coordination Unit for Resource Conservation and Sustainability in the Construction Sector
- **Johannes Lutter.** UIV Urban Innovation Vienna. Head of Strategic Partnerships and International Relations
- **Ding Ma.** City of Lappeenranta. Head of Economic Development
- **Eleni Alexandrou.** National Technical University of Athens. On behalf of City of Athens Deputy Mayor
- **Oleksandra Naryzhna**. Urban Reform. Ukraine

11:05 Coffee break

Parallel Session 1 Knowledge Through Research (Room H213 , Second Floor)

TOPIC 1: RESEARCH- Sustainable solutions to climate change

11:30 Plenary Lecture 1
- Csaba Janacky, University of Szeged and e-CHEMICLES company

12:20 Keynote Lecture 1
- Nikolaos Barbaritsas (Daikin Hellas)

12:50 Institute of Technologies for Sustainability: Smart and Sustinable Polymers and Composites
- Silvia González Prolongo (ITPS - URJC)

13:05 Developing a methodology for Life Cycle Assessments of Higher Education Institutions (HEIs)
- Constantin Keul (LUH)

13:20 AI-Based Flow Sensing for Sustainable Aviation: A Step Towards Climate-Resilient Societies
- Antonio Cuéllar (URJC)

Parallel Session 2 Industrial Partners as vectors of transformation (Room H114 , First Floor)

TOPIC 1: Financial cooperation between companies and universities: from the national to the European level

11:30 EULiST Alliance
- Natia GAMKRELIDZE

11:45 IMT Incubator network
- Paul-Guilhem MEUNIER

12:00 Industrial Projects
- Marc DELAGE

12:30 Fundação Araucária
- Luiz Marcio SPINOSA

12:45 Fondation Mines-Télécom
- Dr. Oliver EPINETTE

13:00 Comments by panel members

Parallel Session 3 Urban Resilience and Climate Neutrality (Plenary Main Hall – Basement)

TOPIC 1: Adaptive buildings and infrastructures

Moderator: Antonios Stamopoulos (University L'Aquila)

11:30 Panel introduction

11:40 Adaptive buildings. From mitigation to adaptation – a short but critically slow evolution
- Eleni Alexandrou (National Technical University Athens)

11:48 Sustainable Building Energy Management and Innovative Vehicle-to-Building (V2B) Connection Infrastructure
- Carlo Villante (University L'Aquila)

11:56 Infrastructure and Urban Landscape: Principles for the (Re)Integration of Railway Lines and Depots
- Sebastian Sattlegger (Technical University Vienna)

12:04 Urban parks as climate-resilient infrastructure
- Cristina del Pozo (University Rey Juan Carlos)

12:12 Beyond zero emissions: rethinking the urban campus as a resilience hub
- Irene Koronaki (NTUA)

12:20 Way too slow – how to speed up climate adaptation of urban streets
- Christian Werthmann (Leibniz University Hannover)

12:30 Debate

Parallel Session 4 Information and Society (Room H126 – First Floor)

TOPIC 1: Building knowledge in collaborations between academia and industry for sustainable development

11:30 Driving Innovation and Accelerate the Green Transition Through Strategic Partnerships
- Kerstin Johansen (JU)
- Linda Bergqvist (JU)
- Per Orestig (Husqvarna Group)

12:00 Reinforcing engineering-focussed research using effective stakeholder focus group studies
- Conor Shaw (LUT)

12:20 Competitive advantage based on sustainable value proposition: Role of ecosystem capabilities
- Imran Ilyas

12:40 Increasing the attractiveness of engineering – enhancing outreach with academia-industry-collaboration
- Johanna Naukkarinen (LUT)

13:00 SmartWB Project: Curricula innovation in climate-smart urban development based on green and energy efficiency with the non-academic sector
- Carmen de Pablos / Miguel Blanco (URJC)

13:20 Comments by panel members
- Kerstin Johansen (JU)
- Linda Bergqvist (JU)
- Per Orestig (Husqvarna Group)

13:30 Lunch break

Parallel Session 1 Knowledge Through Research (Room H213 , Second Floor)

TOPIC 2: EDUCATION- Novel Educational Approaches for sustainable solutions

15:00 **Plenary Lecture 2**
- Prof. Paulo Alexander da Silva Pereira, Mykolas Romeris University, Vilnius, Lithuania.

15:50 **Beyond Carbon Footprint in Education and Research – Learnings from the Development of Course Curriculum in Sustainability Assessment**
- Venkateshwaran Venkatachalam (LUH)

16:15 **Paving the way towards sustainability: transforming knowledge of the circular economy among university students**
- Ana María Vargas (URJC)

16:40 **Case study: IMT Convergence Challenge 2025 – An Innovative Experiential Learning Model for Sustainability and Interdisciplinary Collaboration**
- Ingrid Bazin (IMT)

16:50 **LUT University Climate Action Massive Open Online Courses**
- Michael Child (LTU)

17:00 **Teaching sustainability in universities: What works? A systematic review of waste reduction strategies**
- Adriana del Pilar Rivera (URJC)

17:10 **Service Learning and Sustainability in Engineering Education**
- María Linares (URJC)

17:20 **Integrating Green Chemistry Competences into University Curricula: Responding to Global Challenges**
- Sanjiv Prashar (URJC)tian Werthmann (Leibniz University Hannover)

Parallel Session 2 Industrial Partners as vectors of transformation (Room H114 , First Floor)

TOPIC 2: Structuring Partnerships through Academic projects inside EULiST Alliance

15:00 **Keynote: Academic projects in EULiST Alliance**
- Dr. Olivier EPINETTE

15:15 **Presentation 1: Educational cooperation with Brazil**
- Claudia ENDRECH

15:40 **Interculturality**
- Dr. Najoua GREGOIRE / Catherine SABLE

16:15 **EULiST Student Conference**
- Gregor FISHER / Elisa KREUZEDER

16:30 **A challenge based project on sustainability**
- Prof. Frédérique VINCENT

17:00 **Comments by panel members**

Parallel Session 3 Urban Resilience and Climate Neutrality (Plenary Main Hall – Basement)

TOPIC 2: Urban transformation and circularity

Moderator: Johannes Suitner (Technical University Vienna)

15:00 **Panel Intro**

15:10 **Circular Territories: Design, Resilience, and Social Transformation in São Paulo, Brazil.**
- Angélica Benatti Alvim (Mackenzie Presbyterian University São Paulo, Brazil)

15:25 **Climate neutrality, adaptation, urban circularity and the challenges of transformation**
- Nikos Chrysogelos (City of Athens)

15:33 **Circular transformation in Vienna**
- Bernadette Luger (City of Vienna)

15:41 **Circular Design for Urban Transformation**
- Jörg Schröder / Anna Pape (Leibniz University Hannover)

15:49 **Circular Opposites? Designing with Timber and Earth Across the Reuse-Recycle Spectrum**
- Jakobus Schwarz (Technical University Vienna)

16:00 **Debate**

16:40 **Short break**

TOPIC 3: Digitalisation and AI for urban change: Responsive solutions for smart climate cities

Moderator: Eleni Alexandrou (National Technical University Athens)

16:50 **Panel Intro**

17:00 **City Information Models and Digital Twins – Weighing the Pros and Cons. Between Utopian Visions of the Future and Difficult Choices in the Present.**
- Lucas Reckhaus (Technical University Vienna)

17:08 **The Dynamics of Shared Mobility: From Activity Patterns to System Requirements**
- Dimitris Papanikolaou (National Technical University Athens)

17:16 **Promoting Sustainable Mobility Through Digitalisation at Higher Education Institutions. Experiences and Initial Results from the DiNaMo Project**
- Jonas Koch (Leibniz University Hannover)

17:24 **AI-based monitoring of land cover change using remote sensing data**
- Franz Rottensteiner (Leibniz University Hannover)

17:32 **Earthquake safety: Safety-based urban design practices and digital tools toward resilient public spaces**
- Donato Di Ludovico (University L'Aquila), Federico Eugeni (University L'Aquila)

17:40 **Advanced geomatic techniques for infrastructure surveying and monitoring towards a sustainable and resilient environment**
- Maria Alicandro, Sara Zollini ,Nicole Pascucci, Donatella Dominici (University of L'Aquila)

17:50 **Debate**

Parallel Session 4 **Information and Society (Room H126 – First Floor)**

15:00 **TOPIC 2: Building knowledge for sustainable practices in collaborations between universities, funding agencies and NGOs within and beyond EU**

Experiences from outreach projects

- Timur Uman (JU)
- Olof Brunninge (JU)

15:30 **Cooperation between LUT University and the City of Lappeenranta**

- Ding Ma (Region of South Karelia)

15:50 **Innovative research collaboration for sustainable development**

- Petri Ajo (LUT)

16:10 **LEAP-RE, PROGE and SUNNY Project**

- Antti Pinomaa (LUT)

16:30 **Sistema Madri+d. Science Communication Activities in the Region of Madrid**

- Susana Pérez Holgueras (Regional Government - Autonomous Region of Madrid)

16:50 **novaImpuls: An ecosystem for developing sustainable products in interdisciplinary teams**

- Lotte Schneider(LUH)

17:10 **Comments by panel members**

- Timur Uman (JU)
- Olof Brunninge (JU)

19:00 **Social Activity**

Guided walking tour through the historic centre of Aranjuez.
Meeting Point: Universidad Rey Juan Carlos, Edificio Antiguo Cuartel de Pavía (inner courtyard). San Pascual Street.

20:30 **Dinner**

Location: Hotel NH Aranjuez, San Antonio Street, 22

AGENDA - 21th November

21th November

Parallel Session 1 **Knowledge Through Researchy (Room H213 , Second Floor)**

09:00 **TOPIC 3: Connecting education and research in climate resilience and sustainable solutions**

Creation of teaching materials on heat pumps and hydrogen technology. Connecting Universities - Vocational Schools - Manufacturers. GreenVOCnet Project

- Francisco José Sanchez de la Flor (University of Cádiz)

09:35 **The Fuenlabrada-URJC Chair: A Living Lab for Circular Economy**

- Jovita Moreno (URJC)

10:10 **DESFA's H2 Projects & Connection with Academia**

- Agis Georgios Digkas (DESFA - Hellenic Gas Transmission System Operator S.A.)

10:15 **The ApolloCO2 project**

- Ioannis Plalas (DESFA - Hellenic Gas Transmission System Operator S.A.)

10:30 **PlayInn Plazas: Youth-Driven Innovation for Sustainable Public Spaces**

- Fermina Garrido (URJC)

10:40 **Novel materials for solar photovoltaic modules: green pathway**

- Lucía Serrano Luján (URJC)

10:50 **Advances in Digital, stable and flexible electric networks program**

- Imene Yahyaoui (URJC)

Parallel Session 2 **Industrial Partners as vectors of transformation (Room H114 , First Floor)**

09:00 **TOPIC 3: What are companies' expectations when partnering with a European university?**

Keynote: Companies and EULiST

- Dr. Olivier EPINETTE

09:15 **Global company**

- AIRBUS / Patrick SOYER

09:30 **Startup**

- NANOSTINE / Daniel González Muñoz (CEO)

09:45 **Startup**

- REPLICO / CEO / Juan Pablo DE LA PLATA

10:00 **Roundtable**

10:30 **Summary and debate**

Parallel Session 3 **Urban Resilience and Climate Neutralityn (Plenary Main Hall – Basement)**

TOPIC 4: The societal dimension of urban transformation: Ensuring sustainable and inclusive communities

Moderator: Anna Pape (Leibniz University Hanover)

09:00 **Panel Intro**

09:10 **A Shared Vision of Ukrainian Cities**

- Oleksandra Naryzhna (Urban Reform (NGO)
- Kharkiv National University of Construction and Architecture, Ukraine)

09:25 **Local energy initiatives for democratic future-making: Unpacking temporal ecologies, place knowledge, and Theories of Change**

- Johannes Suitner (TU Wien)

09:33 **Renewable Energy Communities: economic and social analysis toward urban sustainable development**

- Massimo Gastaldi, Paolo Basilico, Idiano D'Adamo (University L'Aquila/Sapienza University Rome)

09:41 **Social Life Cycle Assessment of Mobility: A Finnish Case Study**

- Anna Claudelin (LUT University)

09:49 **Sustainable schools: results and implications for urban climate change**

- Massimo Gastaldi, Idiano D'Adamo, Paolo Basilico, Federico Passarelli (University L'Aquila/Sapienza University Rome)

09:57 **Climate Crisis and Urban Inequality: A Mandate for Resilient Cities**

- Johannes Lutter (Urban Innovation Vienna)

10:15 **Debate**

Parallel Session 4 **Information and Society (Room H126 – First Floor)**

09:00 **TOPIC 3: Science Communication Workshop – Communicating with companies, funding agencies and NGO's**

Workshop: Science Communication practices; Communication as co-creation; Outreach formats; Benchmarking tools. This will be an interactive workshop for participants.

Facilitators:

- Alexandros Iliakis (NTUA)
- Ingrid Colleau (IMT)

11:00 **Coffee break**

Location: Hotel NH Aranjuez, San Antonio Street, 22

11:30 **Final plenary session (Plenary Main Hall, Basement)**

- WRAP-UP of all Parallel sessions and Pre-conference

13:00 **Closing session (Plenary Main Hall, Basement)**

- César Cáceres: URJC Rector's Delegate for EULiST
- Natia Gamkrelidze: EULiST's Secretary General
- Pablo T. Salvadores and Antonia Lampropoulou. EULiST Global Conference Organizing Committee

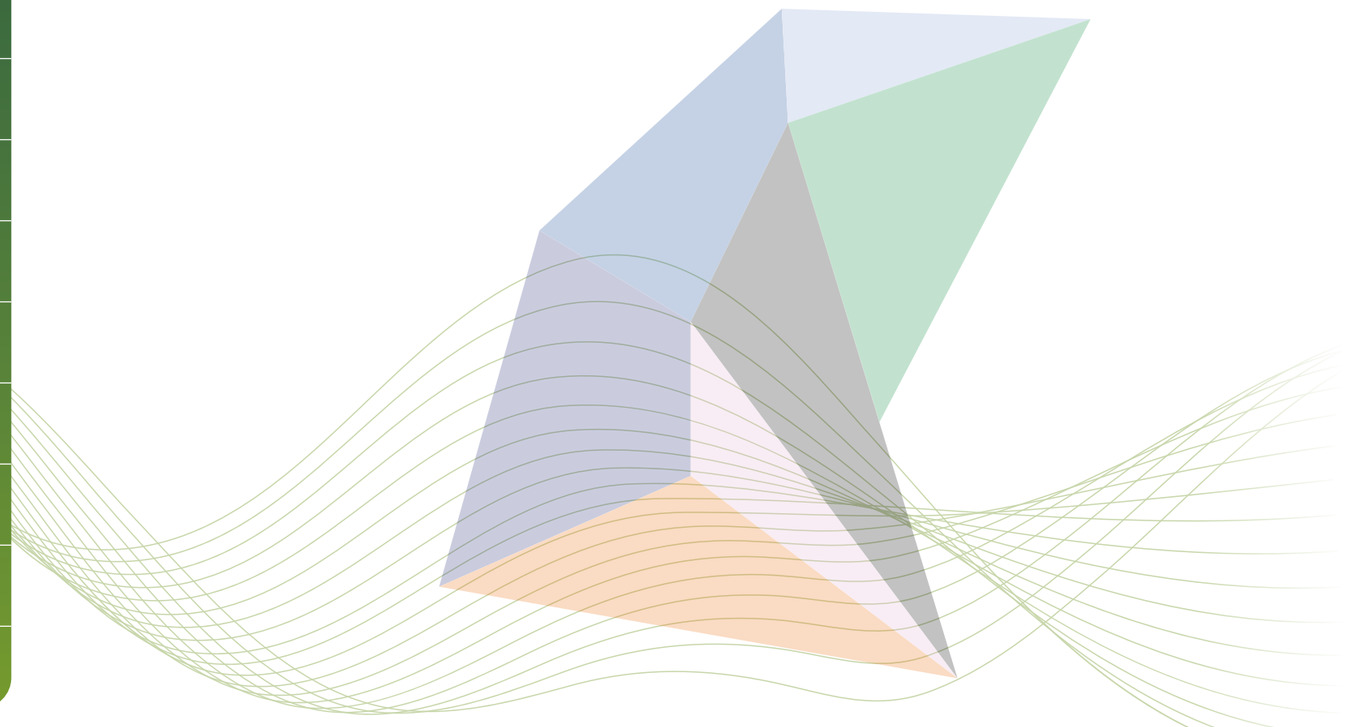
13:30 **Lunch**

3. Organizing Committee

Name	Position	University
Pablo T. Salvadores	Chair of EULiST Global Conference Organizing Committee. Director of Internationalization at URJC	Rey Juan Carlos University
Antonia Lampropoulou	Co-Chair of EULiST Global Conference Organizing Committee. Head of International Relations Department at NTUA	National Technical University of Athens
Juan Manuel García Camús	Head of International Alliances Service	Rey Juan Carlos University
César Cáceres	Rector's Delegate for EULiST at URJC	Rey Juan Carlos University
Katerina Adam	EULiST NTUA Scientific Coordinator	National Technical University of Athens
Kamil Gregorek	Chancellor	Brno University of Technology
Olivier Epinette	Director of International Relations	Institut Mines-Télécom
Emilia Florin	Assistant Professor Business Administration	Jönköping University
Birgit Barden-Läufer	Director of International Office	Leibniz University Hannover
Marcus Hoppe	Deputy Director of International Office	Leibniz University Hannover
Michael Child	Associate professor, Sustainability Science	Lappeenranta-Lahti University of Technology
Edelmilson Parana	Associate professor, Social Sciences	Lappeenranta-Lahti University of Technology
Martin Weis	Vice-dean Faculty of Electrical Engineering and Information Technology	Slovak University of Technology in Bratislava
Allan Hanbury	Head Research Department Data Science	Vienna University of Technology
Bruno Rubino	Vice Rector for International Affairs	University of L'Aquila
Danilo Larivera	Technical Staff member, Faculty of Information Engineering, Computer Science and Mathematics	University of L'Aquila

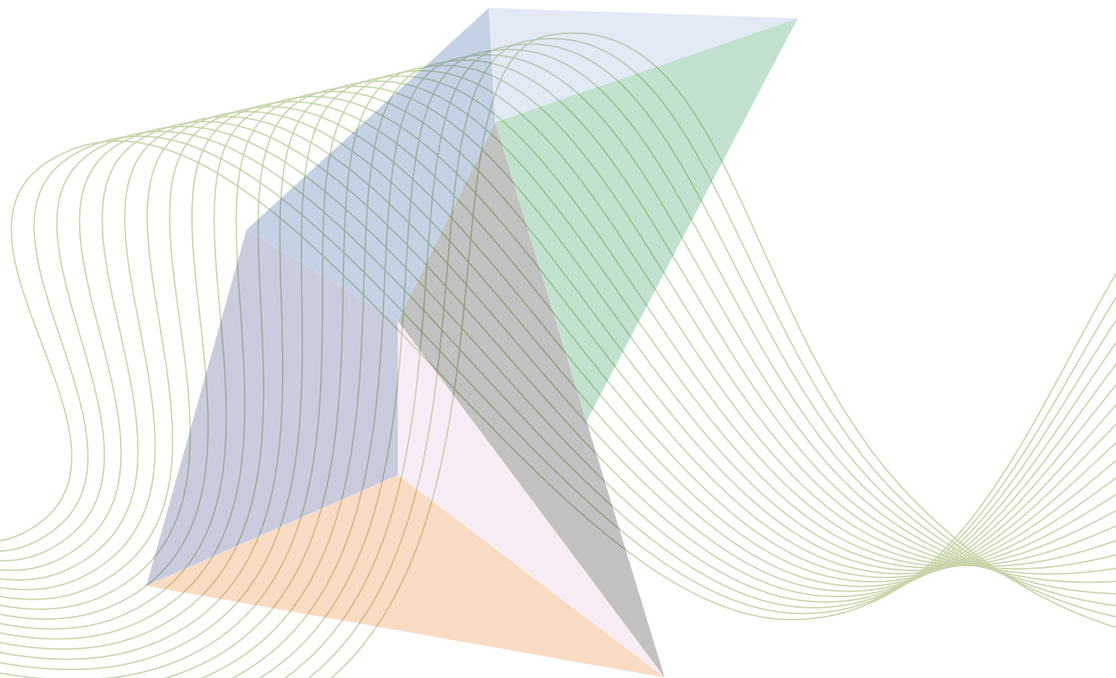
EULiST Local Office at URJC

Name	Position	University
Juan Manuel García Camús	Head of International Alliances Service	Rey Juan Carlos University
Bernardino Muñoz	Deputy of the EULiST Office	Rey Juan Carlos University
Alejandro Navarro Galiano	EULiST Financial Officer	Rey Juan Carlos University
Leticia Díaz	EULiST Officer	Rey Juan Carlos University
Lía Blanco	EULiST Officer	Rey Juan Carlos University
Beatriz Jiménez	EULiST Social Media, Management and Communication Officer	Rey Juan Carlos University
Rosana Moreno	EULiST Administrative Support	Rey Juan Carlos University



4. Scientific Committee

Name	Position	University
Santiago Gómez	Academic Director for Promotion of the International Research	Rey Juan Carlos University
Lucía Blanco	EULiST Officer	Rey Juan Carlos University
Bernardino Muñoz	Deputy of the EULiST Office	Rey Juan Carlos University
Alejandro Navarro Galiano	EULiST Financial Officer	Rey Juan Carlos University
Sotirios Karellas	Director of Thermal Engineering Section, School of Mechanical Engineering	National Technical University of Athens
Eleni Alexandrou	Professor, School of Architecture - Sustainable Design	National Technical University of Athens
Antonia Lampropoulou	Head of International Relations Department. Task 5.3 Co-Leader "EULiST Beyond Europe"	National Technical University of Athens
Jiří Hirš	Professor, Institute of Building Services	Brno University of Technology
Yann Busnel	Senior Vice-President for Research	Institut Mines-Télécom
Kerstin Johansen	Vice Dean of Research, School of Engineering	Jönköping University
Emilia Florin	Assistant Professor Business Administration	Jönköping University
Jörg Schröeder	Dean for Research, Faculty of Architecture and Landscape	Leibniz University Hannover
Anna Pape	Senior Researcher in the Circular Design Innovation Alliance	Leibniz University Hannover
Michael Child	Associate professor, Sustainability Science	Lappeenranta-Lahti University of Technology
Edelmilson Parana	Associate professor, Social Sciences	Lappeenranta-Lahti University of Technology
Martin Weis	Vice-dean Faculty of Electrical Engineering and Information Technology	Slovak University of Technology in Bratislava
Allan Hanbury	Head Research Department Data Science	Vienna University of Technology
Johannes Suitner	Assistant Professor, Institute of Spatial Planning	Vienna University of Technology
Sebastian Sattlegger	University Assistant at the Department of Urban Design	Vienna University of Technology
Maria Benedetta Mattei	Vice-Rector for Research	University of L'Aquila
Giulio Antonini	Vice-Rector for Sustainable Development	University of L'Aquila
Luca Biancofiore	Associate Professor of Industrial and Information Engineering and Economics Department	University of L'Aquila
Antonios Stamopoulos	Assistant Professor of Industrial and Information Engineering and Economics Department	National Technical University of Athens



5. Local Coordinators

Name	University
Juan Manuel García Camús	Rey Juan Carlos University
Antonia Lampropoulou	National Technical University of Athens
Monika Kollmannova	Brno University of Technology
Olivier Epinette	Institut Mines-Télécom
Ann-Sofie Lekenstam	Jönköping University
Kristina Melcher	Leibniz University Hannover
Anne Makkonen	Lappeenranta-Lahti University of Technology
Natália Gurská	Slovak University of Technology in Bratislava
Chris Schubert	Vienna University of Technology
Doriana Scarsella	University of L'Aquila

6. Pre-conference and Parallel Sessions Organisers

Name	University	Panel Responsible
Kerstin Johansen	Jönköping University	Pre-Conference
Maria Benedetta Mattei	University of L'Aquila	Pre-Conference
Santiago Gómez	Rey Juan Carlos University	**Parallel session 1:** Knowledge Through Research
Sotirios Karellas	National Technical University of Athens	**Parallel session 1:** Knowledge Through Research
Olivier Epinette	Institut Mines-Télécom	**Parallel session 2:** Industrial partners as vectors of transformation
Kamil Gregorek	Brno University of Technology	**Parallel session 2:** Industrial partners as vectors of transformation
Jörg Schröder	Leibniz University Hannover	**Parallel session 3:** Urban Resilience and Climate Neutrality
Sebastian Sattlegger	Vienna University of Technology	**Parallel session 3:** Urban Resilience and Climate Neutrality
Imran Ilyas	Jönköping University	**Parallel session 4:** Information and Society
Michael Child	Lappeenranta-Lahti University of Technology	**Parallel session 4:** Information and Society

7. Abstracts for Pre-conference of PhD students and Young Postdocs

Track 1. Renewable energy systems: hydrogen, renewable energy sources, storage solutions, societal impacts

Green hydrogen production by solar thermochemical water splitting with non stoichiometric oxides

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Keywords: Green hydrogen, Thermochemical water splitting, Thermosolar energy, Perovskites, Modified cerium oxides

Abstract. Society is currently facing a critical energy situation, driven by exponential growth in energy demand, which is closely linked to industrial development and global population increase. This demand is mostly covered by fossil fuels, resulting in greenhouse gases emissions, being the main contributors to climate change. For that reason, one of the greatest challenges and objectives of this century is to achieve an energy transition towards a carbon neutral economy. However, there are sectors where the implementation of current renewable technologies is not technically feasible in the short or medium term, such as transportation and thermal energy applications. In these cases, it is essential to explore technical and economically viable alternatives. Hydrogen (H2), especially green H2 produced from renewable sources, emerges as a viable alternative. The most common method for producing green H2 is water electrolysis, although it is not the only one. It can also be obtained through thermochemical cycles driven by thermosolar energy, which typically involve two steps: thermal reduction of a solid metal oxide and subsequent oxidation with H2O, converting H2O into stoichiometric amounts of H2 and O2. A major limitation is that the most effective materials (CeO2) typically require temperatures >1500 °C. In this context, a large number of redox materials have been studied, especially non stoichiometric oxides, showing enhanced redox properties due to oxygen vacancies that improve oxygen mobility and the activity in H2 production terms. The research line of thermochemical cycles in GIQA (Universidad Rey Juan Carlos) focuses on the development of perovskites (type A0.8A'0.2BO3±δ, A = La; A' = Al, Ca) and modified cerium oxides (Ce0.9B0.1O2±δ) with B = Co, Ni, Fe, Cu, synthesized in powder form and evaluated under isothermal conditions at 800-1100 °C. To integrate these materials into solar reactors, they need to be shaped into macroporous structures: reticulated porous ceramics (RPC) and thin films on ceramic monoliths with circular (MC) or square (MHC) channels. Among solar reactor designs, the cavity type reactor was selected for its simplicity, allowing both reaction steps in a single chamber by switching the internal atmosphere. Additionally, the specific H2 production rate and stage durations were studied to optimize the process and minimize nonproductive downtime, revealing that limiting the thermal reduction step increases total H2 production.

Experimental assessment of a 100 kWth dual bubbling fluidized bed biomass gasifier integrated with catalytic hot gas cleaning

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Keywords: Steam Gasification, Catalyst, Hydrogen, Dual Fluidized Bed

Abstract. The growing demand for sustainable energy conversion routes is driving the development of advanced thermochemical technologies capable of transforming renewable feedstocks into clean gaseous fuels. Among them, biomass steam gasification represents a promising solution for producing hydrogen-rich syngas that can be further upgraded to synthetic natural gas or liquid biofuels. Within this framework, the AIRE project aims to design a flexible and integrated system for power generation and renewable energy storage, based on biomass gasification and Bio-SNG production under a distributed grid scheme.

This study presents the results of experimental campaigns carried out on a 100 kWth dual bubbling fluidized bed (DBFB) gasifier coupled with a catalytic hot gas cleaning and conditioning section. The reactor consists of two interconnected fluidized beds operating within a single vessel: an external steam gasification chamber and an internal combustion chamber for bed material regeneration. Heat exchange occurs through both solid recirculation and wall conduction, ensuring thermal stability and efficient energy recovery. The system integrates a hot gas cleaning unit with ceramic filter candles and a secondary catalytic reformer filled with a commercial Ni-based catalyst (K2, Johnson Matthey). Tests were performed using hazelnut shells as feedstock under steam gasification conditions at 825 °C and a steam-to-biomass ratio of 0.85.

The integration of the catalytic reformer significantly enhanced the performance of the DBFB system. The catalyst promoted steam reforming and water–gas shift reactions, achieving near-complete conversion of tar and light hydrocarbons. Tar concentration dropped to almost negligible levels, while the hydrogen content of the syngas exceeded 55% vol (dry basis), indicating efficient reforming and methane cracking. The system demonstrated stable operation with no detectable signs of catalyst deactivation during the test campaign.

Overall, the integrated DBFB gasification–reforming configuration proved technically robust, efficient, and scalable. The results confirm the potential of this approach to produce clean, hydrogen-rich syngas suitable for methanation, hydrogen recovery, or synthesis of high-value chemicals. This work contributes to the advancement of flexible biomass-to-hydrogen conversion technologies and supports the deployment of sustainable thermochemical routes consistent with the European energy transition objectives.

Hydrotalcite-Based Sorbents for green hydrogen production with simultaneous capture and separation of CO2 by Sorption-Enhanced Water-Gas Shift

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Keywords: SEWGS, Hydrogen production, Process Intensification, hydrotalcite-based sorbents

Abstract. The transition to a low-carbon energy system demands innovative processes for the sustainable production of green hydrogen. This research contributes to this goal through the development and assessment of a Sorption-Enhanced Water-Gas Shift (SEWGS) process for upgrading biogas and biosyngas into high-purity hydrogen, while simultaneously capturing and separating CO_2. The SEWGS technology integrates the water-gas shift reaction with in-situ CO_2 sorption, intensifying the process and enhancing hydrogen yield in a single, energy-efficient step.

The work addresses three key innovation areas: (i) process intensification through SEWGS for hydrogen production, still under development at the industrial scale; (ii) the use of biomass-derived feedstocks instead of fossil sources, ensuring renewable and circular carbon pathways; and (iii) the sustainable design of bifunctional materials according to Green Chemistry and Green Engineering principles.

Experimental activities were carried out at the University of L'Aquila for the synthesis, characterization, and testing of hydrotalcite-based sorbent–catalyst materials, and at University College London for process modelling and experimental validation. Among the materials tested, two formulations—20KHT and MeHT—demonstrated promising performance in terms of CO_2 capture efficiency, hydrogen recovery, and mechanical stability under cyclic operation. The results also supported the mechanical design of a lab-scale SEWGS reactor in collaboration with ITALFLUID COSMEP s.r.l., bridging the gap between laboratory-scale research and pilot-scale implementation.
Overall, the study highlights SEWGS as a viable pathway for clean hydrogen production and efficient CO_2 management. When integrated with biomass gasification or anaerobic digestion plants, the process enables the co-production of renewable hydrogen and concentrated CO_2 streams suitable for reuse or storage, promoting both decarbonisation and circular economy goals.

Comparability Index among LCA studies

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Keywords: Comparability Index, Life Cycle Assessment, Representativeness, AI Screening

Abstract. This work introduces a Simplified Comparability Index (CI) Framework designed to enable AI-driven screening of published Life Cycle Assessment (LCA) studies for their relevance to specific use cases. The proposed framework standardizes how comparability between studies is quantified, applying both hard and soft filters across five core indicators: Technological Representativeness, Geographical Representativeness, Temporal Representativeness, Completeness of Scope, and Methodological Alignment. Hard filters act as mandatory conditions—failure in any results in a CI score of zero—while soft filters evaluate degrees of similarity on a three-point scale.

Technological Representativeness assesses whether a study's technology maturity level (Technology Readiness Level, TRL) aligns with the target case, distinguishing between laboratory-, pilot-, and industrial-scale systems. Geographical Representativeness evaluates regional alignment by comparing the study's location or grid mix to that of the target context, acknowledging that differences in energy infrastructure or environmental conditions significantly affect LCA outcomes. Temporal Representativeness accounts for data recency, recognizing that older data or outdated LCI databases (e.g., Ecoinvent versions) reduce comparability.

The two hard filters define minimum inclusion criteria. Completeness of Scope ensures that both system boundaries and functional units are consistent with the target LCA; omission of essential life cycle stages or mismatch of functional units disqualifies a study. Methodological Alignment verifies compatibility in LCA approach (attributional vs. consequential) and allocation method (mass-, energy-, or value-based). Only studies meeting both hard filters proceed to CI computation. For qualifying studies, the CI is calculated as the unweighted average of the three soft filter scores, ranging from 1 (highly comparable) to 3 (poorly comparable). The framework prioritizes transparency, simplicity, and extensibility—future enhancements may include a finer 1–5 scale, adjustable weighting of indicators, and user-defined inclusion thresholds. Ultimately, this approach aims to automate and standardize the evaluation of LCA comparability, improving methodological consistency and enabling scalable integration into AI-assisted sustainability analyses.

Track 1

Electrifying stories: The economy, the environment and global change in news media discourse on the developing Finnish battery industry

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Keywords: battery industry, discourse analysis, social science

Abstract. Abstract is from a published original research article in Energy Research and Social Science (2025).

Article

The green transition necessitates large-scale battery solutions. Finland has initiated the development of a national battery cluster, supported by a range of policy instruments aimed at attracting investments. Although energy social research has examined the role of language and power in energy policy through discursive approaches, limited attention has been paid to how the battery industry is represented and contested in news media. We deem these debates crucial because of the centrality of meaning-giving to policy formation, especially the intricate interdependencies between media coverage, public opinion, and the shaping of policy decisions about emerging technologies. This study employs argumentative discourse analysis (ADA) to investigate how the development of the Finnish battery industry is discursively constructed and contested in the news media and which storylines and linguistic devices are used by which actors or discourse coalitions. A total of 287 articles published between 2020 and 2024 on two Finnish regions developing battery clusters were analyzed. The findings reveal four main storylines: speeding up the investments, concern about the local environment, small Finland amid global change and education for growth. The analysis demonstrates that powerful discourse coalitions—particularly political and industrial actors—predominantly frame battery investments as urgent and economically beneficial, often marginalizing environmental and geopolitical risks. These risks are downplayed through narratives emphasizing national competitiveness and economic opportunity. By examining these discursive dynamics, the study contributes to a deeper understanding of the evolving relationship between the state and the market, highlighting the increasing role of the state in shaping industrial development.

Renewable Heating and Power Systems for Low-Carbon Residential Energy Transition

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Keywords: Residential energy systems; Renewable heating; Heat pump; Photovoltaic integration; Life-cycle assessment

Abstract. The decarbonisation of residential heating is essential to achieving a cleaner and more sustainable energy future. This study investigates an integrated renewable-based heating and power system for residential buildings that combines air-source heat pumps, photovoltaic (PV) generation, and thermal storage. The aim is to supply heating, cooling, and electricity with minimal environmental impact while maintaining user comfort and affordability.

A dynamic model of the system was developed to simulate thermal behaviour, climatic variability, and daily demand patterns. The optimisation focused on improving overall energy efficiency and reducing dependence on fossil-fuel utilities. The environmental and economic performance of different system configurations was evaluated using life-cycle assessment (LCA) and techno-economic analysis (TEA) to identify the most sustainable solutions.

Results under Central European climate conditions show potential energy savings of up to 50 % and CO2 emission reductions of around 60 % compared with conventional gas-based systems. The findings demonstrate that the combined use of PV generation, heat pumps, and storage can significantly enhance flexibility, lower operational costs, and accelerate the low-carbon transition of the residential sector. This research provides a practical pathway toward cleaner, decentralised, and renewable-driven home energy systems supporting Europe's energy transition goals.

Track 2. Innovations in advanced materials and smart manufacturing for Sustainable Industry 4.0

Developing an Integrated Management and Evaluation Standard for Megaprojects across their Spatial Life Cycle

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Keywords: Megaprojects Management, Spatial Planning, Megaproject Performance Index (MPI), Machine Learning, Megaproject Paradox Theory

Abstract. Megaprojects -investments exceeding $1 billion- are characterized by significant economic, social, environmental and spatial impacts. Despite their long-term benefits, they often face the "Megaproject Paradox Theory," resulting in higher costs and fewer benefits than anticipated due to management problems, underestimation of difficulties, and excessive optimism. This paper addresses these challenges by proposing an integrated model for the evaluation and management of Megaprojects across their spatial life cycle.

This model introduces the "Megaproject Performance Index" (MPI), a unified, composite index that summarizes the overall project performance. The MPI integrates a broad range of indicators, including Environmental (ENV), Social (SOC), Economic (ECO), Risk, Uncertainty and Complexity (RUC), Stakeholders (STAKE), Governance & Ethics (GOV), Resilience and Adaptability (RES), and Long-term Value Creation and Legacy (MACVG). The methodology combines data collection and normalization from various sources, -including IoT sensors, ERP/CRM systems, surveys and social media analytics- with the determination of indicator weights through the Analytic Hierarchy Process (AHP) and expert interviews. To explore causal relationships and feedback loops, the model applies System Dynamics for dynamic simulation.
Additionally, it incorporates the RUC Theory, introducing penalties to indicators affected by risk factors. An innovative element of the model is the integration of machine learning techniques, specifically the Random Forest algorithm, to predict future indicator values and risks. Random Forest was chosen for its ability to handle diverse types of variables, its builtin mechanism for assessing feature importance, and its robustness against missing data and overfitting, making it well-suited for complex real-world datasets.

The proposed model offers a holistic, dynamic, and data-driven approach to enhance the management and sustainability of Megaprojects. Specifically, the MPI functions as a decision-support tool for evaluating spatial scenarios, identifying optimal solutions, and visualizing geographically project impacts through GIS. In doing so, it promotes more informed and sustainable spatial decision-making.

Mycelium-Based Composites and Digital Fabrication: Exploring New Pathways for Sustainable Architecture

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Keywords: Mycelium-Based Composites; Digital Fabrication; Computational Design; Biofabrication; Sustainable Architecture

Abstract. Mycelium-Based Composites (MBC) are emerging as promising bio-based materials for sustainable construction and manufacturing systems that regenerate rather than deplete. This is due to their unique material properties, low embodied energy, biodegradability, and ability to grow into complex forms. This research investigates how the informed use of MBCs can be integrated into the early architectural design stage and how digital fabrication processes contribute to redefining the concept of "smart manufacturing" as an ecologically co-creative process within the framework of Industry 4.0. The study presents an analysis of realised architectural projects that have applied MBC materials, identifying their methods, material approaches, as well as technological, computational, and design pathways. The findings highlight both the potential and the current limitations of mycelium in the architecture, engineering, and construction (AEC) sector.

Building on this groundwork, a digital tool, CELLIA, is being developed within the Rhino 8 / Grasshopper software environment, aimed at the mass generation and evaluation of digital MBC formwork geometry based on a digital 3D architectural model. The digital formwork geometry produced by CELLIA is ready for real-world production processes (3D printing, milling, casting, etc.) to be further used in the process of controlled mycelial growth for each MBC building element.

Research and development of CELLIA is being conducted in collaboration with professional architects, civil engineers, and local mycelium growers. The objective of this tool is to effectively shorten the time needed for evaluation and mass production of complex architectural MBC designs, saving valuable time for key design work and strategic decisions, rather than demanding 3D modelling of individual formwork geometry. CELLIA aims to bridge the field of digital computational design with emerging biofabrication methods, creating opportunities for further experimentation and data-driven design processes within the AEC sector.

Hybrid Additive Manufacturing for Agile and Sustainable Tooling: The AGILITY Project

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Keywords: Additive Manufacturing, Hybrid Tooling, Polymer, Surface Finishing, Sustainable

Abstract. The INTERREG VI FWVL AGILITY project, supported by the brain trust of IMT Nord Europe, together with cross-border partners, tries to enhance the industrial agility, productivity, and competitiveness of accelerating product development while reducing costs and time-to-market.

Additive manufacturing, mainly through Fused Filament Fabrication (FFF), has been very instrumental in realizing flexibility and swiftness for bespoke tooling fabrication for manufacturing and maintenance operations.
The first part of our research is the PEI-ULTEM 1010 needed for the manufacturing of mold inserts that could support the injection parameters of polypropylene for pilot batches. For this reason, the approach underlines how AM contributes to the circular economy objectives of eco-design, recyclability, and end-of-life revalorization chain of technical polymers.
From prototype to a robust industrial solution, able to support more than 500 injection cycles, we will produce the tooling in thermally and dimensionally very stable carbon-fiber-reinforced Polyphenylene Sulfide-PPS-CF-to guarantee precision and tool longevity.

Even with high-performance polymers, the surface quality is the most decisive limitation of FFF-lower layer lines affect demolding and tool lifetime. Therefore, to deal with this challenge, a hybrid tooling strategy will be performed by combining:

1. FFF additive manufacturing technique to produce the overall shape quickly
2. CNC machining: It raises dimensions' accuracy and improves the surface roughness Ra/Rz.
3. The laser polishing technique reduces surface roughness by up to 91%, reaching a quasi-molded surface finishing suitable for industrial validation.

This research work depicts how hybridization-based AM, CNC, and laser finishing associated with high-performance composite materials are going to transform additive manufacturing flexibility into a sustainable, precise, and competitive tooling solution. In this line, the AGILITY project directly contributes to the evolution toward a circular and high-performance Industry 4.0, promoting innovation, resilience, and environmental responsibility in modern manufacturing.

Effect of laser powder bed fusion parameters on the functional properties of Ni-Mn-Ga magnetic shape memory alloys

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Keywords: Laser powder bed fusion, Ni-Mn-Ga magnetic shape memory alloys, Martensitic transformation, Scanning strategy, Volumetric energy density.

Abstract. Additive manufacturing using laser powder bed fusion (PBF-LB) offers new possibilities for producing complex Ni-Mn-Ga magnetic shape memory (MSM) actuators. However, achieving optimal functional performance is still challenging due to compositional variations and microstructural constraints introduced during processing. This study systematically examines the effects of key PBF-LB parameters on the structural and magnetic behavior of Ni-Mn-Ga MSM alloys.

Two experimental batches were designed: Batch 1 varied scanning speed and hatch distance, while Batch 2 explored different scanning strategies, including unidirectional, bidirectional, and rotated scan vectors. Next, the input parameters were investigated for their influence on manganese evaporation, relative density, crystal structure, martensitic transformation, and magnetic properties.

A volumetric energy density (VED) of approximately 50 J/mm^3 resulted in a five-layered modulated tetragonal martensitic structure at ambient temperature, whereas a higher VED of 65 J/mm^3 produced a seven-layered orthorhombic martensite. Unidirectional scanning led to increased cracking and unstable melt-pool behavior, whereas rotated bidirectional scans showed little impact on magnetic or structural properties.
These findings enhance our understanding of how PBF-LB processing conditions affect phase formation and functional performance in Ni-Mn-Ga alloys, providing valuable insights for the development of energy-efficient MSM actuators.

Track 2

Robot Imitation Learning from Videos for small scale production

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Keywords: robotics, imitation learning, dexterous tasks, manufacturing

Abstract. While robots are already widespread in the automotive industry, they are not very common for small scaled production and for fine-grained tasks. Easier programming of robotic systems would open new application areas. My PhD thesis investigates methods to make robots able to learn dexterous tasks from monocular 2d videos, which are done with hands. As an example, making a knot is a challenging task for robots. This work should reduce the barrier for small businesses to apply robots for manufacturing small parts, allowing them to adapt the production easily if any changes are needed. While the goal is appealing, there are several possible solutions to test and challenges to overcome. Currently, my investigations mainly explore two directions: incorporating hand pose estimates into imitation learning, and developing video-to-action models. First, the detection of hands in videos is in general a well-investigated problem, but the accuracy can be low when parts of the hand are occluded. The incorporation of confidence of the pose estimation into the imitation learning process can help to speed up the training and make the training more robust against badly recognized poses. For passages where the hand pose cannot be inferred with enough confidence, the learning algorithm must focus on the effects of the hand movements, for example if an object is moved. Furthermore, hand priors could make the process more stable by reducing the search space, effectively speeding up the training. Second, inferring robot actions from videos is an interesting research topic, as it would allow to leverage video generation models for controlling a robot. Similar to the first point, occlusion is a major issue to infer the robot pose. Instead of estimating complete robot poses, one approach is to predict actions by comparing the current and target images of the robot in slightly different poses. My presentation will discuss these approaches, preliminary results, and the implications for flexible, small-scale robotic manufacturing.

Track 3. Climate change, environmental resilience, and green urban transitions: technologies and strategies for a sustainable future.

Climate Crisis and existing buildings' resilience: The Athenian Polykatoikias of the period 1920 - 1960

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Keywords: Climate Crisis, existing buildings, resilience, Athenian Polykatoikia

Abstract. Just a few months away from the year 2026, the constantly evolving effort for structural and institutional changes in human activities with the aim of controlling the most acute environmental problems is constantly being reshaped. The built environment is largely related to the global share of environmental, economic and social impacts, with the construction sector contributing to18,4% of the total global greenhouse gas emissions. The solution to the problem is the sustainable design. Energy-efficient buildings constitute the basis for the sustainable development of the urban centers and their transformation into the green cities of the future. Such structures can be produced in two ways. Through the design and construction of new nearly zero energy buildings, and through the structural and energy upgrade of the existing building stock.

In the case of the later one, it is more urgent than ever before that both individually per country and collectively as a planet, are investigated the ways in which can be taken advantage of the existing building stock and upgrade its energy performance, aiming at preserving Earth's environment through sustainability and ensuring that future generations will still have access to clean air, water, and resources. Climate change and existing buildings resilience is a cutting-edge topic which includes various challenges, such as the identification of the methodology to be followed, and the complexities and restrictions existing in the case of listed buildings and monuments, which constitute a significant proportion at a global level, and which must be protected and successfully delivered to the future generations.

The apartment buildings of the period 1920 – 1960 located in the city of Athens, constitute a representative example of the existing building stock, not only for Greece, but also for other countries. The PhD research thesis with topic "Architecture – Structure – Energy: Energy upgrade of historical buildings, the case of the ATHENIAN POLYKATOIKIA of the period 1920 – 1960", not only presents the process to be followed when dealing with historical structures, but it also evaluates the thermal behaviour of the typology of the Athenian Polykatoikias, and investigates its correlation with their special architectural, geometric and construction characteristics. At the same time, real temperature and heat flow measurements, as well as energy analyses and simulations, are performed for 6 selected case studies.

Territorial regeneration and settlement patterns in a rapidly growing Chilean urban agglomeration. The case of Puerto Montt and Puerto Varas

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Keywords: Settlement patterns, territorial regeneration, circular processes, urban expansion.

Abstract. The intense urbanisation process has continuously transformed Chilean urban agglomerations. Deregulated expansion areas frequently develop independently, neglecting spatial, environmental, and social factors, while attempting to mitigate environmental risks. In southern Chile, the cities of Puerto Montt and Puerto Varas have experienced accelerated growth, resulting in fragmented urban morphologies with diverse settlement patterns extending beyond their formal urban boundaries. Despite extensive research on urban expansion, there remains a gap in understanding the dynamics of these settlement patterns at the regional scale.

This study investigates how various settlement patterns at urban-rural interfaces can influence territorial regeneration. It examines the role of urban, social, and environmental processes in reweaving fragmented territories on a regional scale. Additionally, the specific conditions of the case study enhance the understanding of territorial regeneration, framing it as an emerging guiding principle for circularity. Furthermore, the variety of uses and dynamics within these areas promotes closer geographical proximity, thereby improving the efficiency of resource production.

Focusing on the recently designated Puerto Montt - Puerto Varas Metropolitan Area (2025), the study's methodology involves a multi-scalar spatial analysis to map and characterise settlement patterns inside and beyond formal urban boundaries —ranging from agricultural land and farms, industrial and commercial zones, to detached houses on agricultural plots, fishbone residential areas, and social housing developments. Additionally, the analysis integrates natural land conditions, environmental risks, social factors, transport networks, and urban development to explore their dynamics and potential for regeneration at a regional scale.

By analysing the unique dynamics and settlement patterns in Puerto Montt and Puerto Varas, territorial regeneration emerges as a tool to reconnect and reshape the territory through a circular approach. The conceptual elasticity of regeneration allows it to be studied from both urban and ecological perspectives, strengthening the link between regional planning and local settlement patterns. Ultimately, the study positions territorial regeneration as an innovative approach to sustainable development.

Green Infrastructure for Climate-Resilient Cities: Pathways Toward Sustainable Urban Futures

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Keywords: Green Infrastructure, Urban Climate Resilience, Sustainable Urban Development , Climate Adaptation and Mitigation

Abstract. Green infrastructure (GI) has emerged as a cornerstone of sustainable urban development, offering a multifunctional approach to addressing the challenges posed by climate change. This paper explores how green infrastructure—including urban forests, green roofs, wetlands, permeable surfaces, and ecological corridors—contributes to climate adaptation and mitigation, disaster risk reduction, and biodiversity conservation in urban environments. By enhancing ecosystem services such as flood control, heat regulation, and carbon sequestration, GI strengthens the environmental resilience of cities while improving air quality, public health, and overall livability. The study further investigates the technological and policy frameworks that enable the integration of green infrastructure into urban planning, emphasizing cross-sector collaboration, community participation, and innovative financing mechanisms. Case examples from diverse urban contexts illustrate best practices and barriers in implementing large-scale GI initiatives. The findings underscore that prioritizing green infrastructure is essential not only for environmental sustainability but also for fostering socio-economic resilience and advancing the transition toward green, climate-smart cities.

Track 3

Orchestrating Cross-Sector Collaboration for Regenerative Futures: Success Factors Strategies in Multi-Stakeholder Partnerships

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Keywords: Orchestrating collaboration; Regenerative futures; Cross-Sectoral Partnership

Abstract. As humanity confronts the critical climate decade to 2030, the concept of ecological overshoot—where resource consumption exceeds Earth's regenerative capacity—demands a paradigm shift beyond conventional sustainability toward regenerative approaches that actively restore ecosystems and rebuild community resilience. Achieving such outcomes requires unprecedented collaboration across public, private, and civil society sectors. This research investigates how collaborative models can be effectively structured, governed, and orchestrated to enable systemic transformation toward climate-resilient regenerative futures.

The study addresses three interconnected research questions. First, how can collaborative frameworks be structurally designed to enable effective cross-sector partnerships for climate resilience, exploring governance structures, institutional roles, and legal frameworks across domains such as sustainable agriculture, renewable energy, blue economy, and green urbanization? Second, how do technological innovations, digital platforms, and data-driven strategies enhance adaptive governance, strengthening decision-making for climate adaptation, disaster risk reduction, and ecosystem monitoring while building stakeholder trust? Third, what pathways enable replicating and scaling collaborative models across diverse contexts, considering socio-economic impacts and factors influencing transferability?

Grounded in systems thinking, the research frames collaboration as innovation infrastructure for green transitions, integrating open innovation ecosystems, dynamic capabilities, stakeholder value creation, and regenerative leadership to examine orchestration at the ecosystem level.

Methodologically, the study employs interdisciplinary qualitative approaches through comparative case studies across regenerative different geographical domains such as Indonesia, Australia, and the EU. Data collection combines semi-structured interviews with adaptation stakeholders—including public institutions, NGOs, technology providers, and community actors—document and platform analysis of governance systems, and co-creation workshops for collective sense-making.

Expected contributions include advancing frameworks for collaborative governance in climate resilience; delivering methodologies and design principles for partnerships; and offering policymakers actionable insights to strengthen multi-stakeholder collaboration towards regenerative futures.

Material Flow Analysis as an Approach to Battery Classification for Effective Waste Management: A Case Study in the Czech Republic

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Keywords: Waste Management, Waste Reporting, Material Flow Analysis, Circular Economy

Abstract. The sustainable management of waste batteries remains a key challenge due to inefficiencies in current classification systems, which hinder its effective recycling, reuse, and material recovery. This study aims to address these issues by conducting a Material Flow Analysis of the battery waste streams in the Czech Republic and offer guidance for optimising the classification system by identifying the inefficiencies of current reporting system. Real-life data were collected from the national waste register, collective take-back systems, and mixed municipal waste analysis. The results include an overview of the main flows influencing the waste generation and MFA of the waste batteries, visualized using Sankey diagrams. The quantity of batteries discarded in mixed municipal waste was identified as 0.9 kt, which is a high value compared to the number of waste batteries collected in the separate municipal sorting infrastructure (1.6 kt). The results highlight significant inefficiencies of waste battery management, particularly related to batteries ending up in mixed municipal waste. The study concludes that improving battery classification can facilitate sustainable waste management, achieve more efficient material recovery, extend battery life cycles, and reduce the environmental impact of battery use in the Czech Republic.

Track 3

Urban Metabolism and connectivity in polycentric urban systems: A Systems-Engineering approach to analyzing the Urban Energy Footprint within Italy's complex settlement pattern

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Keywords: Urban Metabolism; Polycentric Connectivity; Energy Footprint; Systems Engineering

Abstract. This contribution proposes an integrated framework of technologies and strategies for green urban transitions that links urban metabolism, polycentric connectivity, and environmental resilience across Italy's complex settlement system, with a specific focus on inner areas. It consistently quantifies energy and material flows, operating costs, and systemic vulnerabilities, situating the analysis within decarbonization pathways aligned with the "Net Land Take Zero 2050" target and oriented toward climate adaptation and mitigation, disaster risk reduction, biodiversity protection, and water-sensitive planning. Methodologically, the work combines flow-oriented families: Material Flow Analysis, Ecological Network Analysis, and Life Cycle Assessment, within a System Dynamics backbone and applies systems engineering instruments: ISO 81346 multi-aspect designation, SysML block and interface modeling, the N^2 matrix, and graph theory. Function-al geographies (Local Labour Systems) replace administrative borders; municipalities are modeled as nodes typed by population/employment, density, and service endowment, while edges capture everyday mobility connections weighted by observed flows and generalized costs. The framework delivers maps of urban energy footprints and material exchanges for 2001, 2011, and 2021 with forward scenarios; network indicators of centrality, robustness, redundancy, and failure points; and operational criteria for delineating the Perimeter of Urbanized Territory (PTU) and prioritizing "energy-aware" investments. To counter sprawl, fragmentation, land take, and deforestation, Nature-Based Solutions (renaturalization, urban forestry, ecological corridors, and blue-green infrastructure) are integrated to mitigate heat islands, flooding, and drought while enhancing carbon sequestration, ecosystem continuity, and water retention, reuse, and sustainable drainage. Expected socio-economic returns include lower operation and maintenance costs for public services and technical networks, improved accessibility and cohesion in peripheral areas, health benefits from reduced emissions and heat stress, and strengthened social resilience through more proximate and redundant networks. Overall, the method is measurable and transferable, connecting metrics, spatiality, and settlement organization into a replicable evidence base for climate policy and the transition to low-carbon, resilient, biodiversity-positive, and water-sensitive cities.

Track 4. Bioengineering, biotechnology, and smart systems for health, mobility, and sustainable communities

The Spatial Dimension of Accessibility: Digital and Technological Tools in the Potential Redefinition of the Means of Achieving Accessibility

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Keywords: Accessibility, Inclusion, Computational Design, Positioning Systems, Navigation Applications

Abstract. When one tries to describe what "accessibility" means within the contemporary built environment, it soon becomes clear that the concept cannot be reduced to a set of technical standards or legal provisions. At times it appears as a fluid and constantly shifting condition; at others, as a matter of social justice or even as a tool for the geometric configuration of space itself. The question is not simply whether one can enter a building, but rather how the very notion and experience of space are shaped once access becomes possible.

This dissertation situates itself at the intersection of architecture, technology, and, inevitably, the legitimizing dimension of space. The growing presence of digital tools—from algorithmic models and geolocation systems to small-scale fabrication and digital manufacturing techniques—does not merely offer technical convenience. It may instead suggest the emergence of a new typological horizon, one in which traditional norms and measurements are supplemented, and sometimes challenged, by dynamic and hybrid forms.

The research does not attempt to impose a universal definition of accessibility. It seeks instead to trace the tensions that surface when the demand for inclusion collides with the preservation of cultural heritage. In such cases, the "solution" is rarely straightforward. Whether accessibility should prevail over authenticity—or the reverse—cannot be answered through a single rule. It calls for interdisciplinary dialogue, negotiation, and, quite often, a willingness to tolerate ambiguity.

Accessibility, then, cannot be treated as an afterthought or a marginal addition to architecture. It is a fundamental part of how space is perceived and lived. The point of departure for this research is the recognition that standardized responses fall short. Geometric interventions such as ramps and elevators, though necessary, do not exhaust the meaning of access. What is needed is a renewed perspective—one that brings together technical precision with experiential understanding. Ultimately, through a series of research explorations and case studies presented and analyzed in detail, the dissertation proposes a typological framework where spatial qualities and technological characteristics act in concert rather than in isolation.

Safety, Trust, and Transparency in Socially Assistive Robots

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Keywords: Socially assistive robot, artificial intelligence, care robots, vulnerable population

Abstract. Care robots are moving from pilots to real-world deployment, yet their effectiveness depends on whether users can quickly understand what the robot is doing and why. My current research focuses on the intersection of transparency, safety and trust in socially assistive robots. These systems often include not only robots but also integrated elements such as tablets, computers, and sensors. I aim to explore how transparency influence user experience and how to design communication strategies that strike the right balance by providing just-in-time explanations that are informative but not overwhelming. A key question driving my work is: how much transparency is too much? Over-explaining can be tedious, yet under-explaining may lead to discomfort or distrust. I also investigate the most effective modalities for delivering explanations, whether through speech, text, lights, or other cues. I have worked extensively with both children and older adults in various human-robot interaction (HRI) projects.

My broader research ambition is to design, develop, and evaluate human-machine systems that meet the needs of vulnerable populations, particularly older adults and children. I approach this by transferring insights from human-human interaction studies into the design and evaluation of human-machine systems. I'm particularly interested in how interaction patterns evolve over time and how we might predict changes in user responses using interaction data. With emerging technologies and artificial intelligence increasingly integrated into everyday life, understanding how humans interact with these systems, and designing for transparency, trust and safety is more critical than ever.

Mathematical modeling of biomedical applications and optimization

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Keywords: Mathematical modeling, optimization, finite element analysis, partial differential equations, biomedical applications

Abstract. In this thesis, we present mathematical modeling frameworks for computational design and optimization in biomedical and pharmaceutical applications. First, a two-material optimization approach based on the Solid Isotropic Material with Penalization (SIMP) method is proposed and applied to reinforce 2D cantilever beams to enhance stiffness and reduce displacement while maintaining the original geometry. The method provides a numerically robust and straightforward alternative to conventional multi-material topology optimization. The framework is extended for 3D geometries and applied to a 3D denture. Thanks to this method, the denture reinforcement is placed and optimized. The research also studies computational modeling of 3D-printed drug design, in which experimental dissolution data are fit to six kinetic models using the SUBPLEX algorithm and the NLopt library. This enables the identification of drug release mechanisms and contributes to modeling. Finally, an optimization method is introduced to design optimal drug components. The method consists of the Noyes–Whitney and Eikonal equations and uses topology optimization to achieve target release profiles, such as linear and pulsatile behaviors. The method also accounts for uncertainties in the dissolution rate of the materials using a stochastic reduced-order model (SROM). Compared to Monte Carlo methods, SROM offers better computational efficiency. These studies improve computational design and optimization, which contribute to the development of personalized biomedical devices and 3D-printed drug delivery systems.

Adaptive Multi-Agent Anomaly Detection for Smart Mobility and Sustainable Communities

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Keywords: Sustainable Communities, Artificial Intelligence, Smart Systems

Abstract. Europe's transition toward digital and sustainable societies relies on trustworthy Artificial Intelligence and secure cyber-physical infrastructures. Yet, growing cybersecurity threats, fragmented data ecosystems, and the lack of adaptive monitoring frameworks continue to endanger critical sectors such as mobility, healthcare, and public governance. This research aims to explore how AI-driven cybersecurity architectures can enhance the resilience and sustainability of emerging smart systems across European communities. The proposed study envisions an adaptive, multi-agent framework that integrates autonomous anomaly detection, semantic reasoning, and privacy-preserving collaboration among distributed IoT and edge devices. Instead of relying on centralized monitoring, intelligent agents would learn to detect abnormal patterns locally and share insights securely through federated learning and blockchain-based trust mechanisms. This approach seeks to improve situational awareness, transparency, and response coordination without compromising user privacy or energy efficiency. The research aligns with key European policy goals, including the EU AI Act, the Cyber Resilience Act, and the Digital Decade 2030, supporting the creation of safe and interoperable digital ecosystems. By addressing the gap between AI innovation and cybersecurity governance, the work intends to contribute to EULIST's broader vision of sustainable, human-centered, and resilient smart communities. Ultimately, this project will investigate design principles, simulation strategies, and evaluation metrics for scalable AI-based security solutions capable of supporting sustainable urban environments, ethical data sharing, and resilient community infrastructures across Europe.

Advanced conductive polymer composites for wearable sensing applications

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Keywords: stimuli-responsive polymers, electrical behavior of composites, strain sensors, thermistors

Abstract. The rapid evolution of wearable technologies over the last years has placed a growing demand for multifunctional, reliable, biocompatible, and recyclable materials for different stimuli-responsive applications. In modern biomedical engineering and remote diagnostics, a central challenge is acquiring accurate, continuous physiological information from users without interfering with their comfort or daily activity. Data such as strain, pressure, temperature, or biochemical analytes is directly measured from the patient's skin.

Over time, these wearable systems have evolved from rigid and portable devices such as smartwatches to lightweight, flexible patches and smart tattoos. A key requirement for these devices is their ability to conform to the complex, non-planar surface of human skin. Thus, the main challenge remains the balance between mechanical flexibility, electrical functionality, durability, and user safety.

To bridge this gap, researchers are turning to advanced materials, and the most promising candidates are the conductive polymer nanocomposites, owing to their flexibility, lightweight nature, and capacity for real-time electromechanical sensing based on the piezoresistive response. This transduction method, conferred by adding conductive particles, where mechanical strain induces a measurable change in electrical resistance, is the predominant sensing mechanism employed. This mechanism is particularly suitable for continuous strain or pressure monitoring in wearable electronics, mainly due to their simple signal readout and high sensitivity.

In the research group I belong to, we explore in depth the design, fabrication, and performance evaluation of thermoplastic-based nanocomposites reinforced with conductive nanostructures. Specifically, it focuses on two thermoplastic matrices: poly (vinylidene fluoride-co-hexafluoropropylene) (PVDF-HFP) and thermoplastic polyurethane (TPU), each chosen for its processability, chemical stability, and potential recyclability. The matrices were doped with different conductive particles, including carbon nanotubes (CNTs), graphene nanoplatelets (GNPs), and MXene nanoflakes.

Track 4

8. Abstracts for Parallel Sessions

PS1 - T1: RESEARCH - Sustainable solutions to climate change

Developing a methodology for Life Cycle Assessments of Higher Education Institutions (HEIs)

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Short Bio: Constantin Keul is an engineer specialized in Life Cycle Assessment (LCA). He holds degrees in Mechanical and Biomedical Engineering with experience in R&D and sustainability research, including industry projects, LCAs of biobased plastics and organisations. Since 2024, he works as a research associate at the Institute of Plastics and Circular Economy in the department of Sustainability Assessment at the Leibniz University Hannover and is pursuing a PhD on LCAs of Higher Education Institutions.

Abstract: Life Cycle Assessments (LCAs) of Higher Education Institutions (HEIs) are becoming more important as these institutions, despite their core functions in education, research, and innovation, are responsible for significant environmental impacts. This makes it necessary to develop a standardized LCA methodology for Higher Education Institutions (HEIs), addressing the complexity and diversity of their environmental impacts. A systematic literature review of LCA studies on HEIs shows inconsistencies and challenges in system boundaries, impact categories, data sources and data quality, methodological transparency, and the consideration of emerging factors such as digitalization. From these studies, environmental hotspots are identified and linked to influencing institutional and behavioural parameters. Based these findings, a framework will be proposed that adapts the established LCA phases to the specific structures of HEIs and will be tested at a case study at Leibniz University Hannover within a EULiST project. The approach also enables future integration of social and economic dimensions for a holistic sustainability assessment.

PS1 - T1

Institute of Technologies for Sustainability: Smart and Suatinable Polymers and Composites

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Short Bio: She is a Full Professor of Materials Engineering at Universidad Rey Juan Carlos and leads the Smart and Sustainable Polymers and Composites Research Group. With an h-index of 35, FWCI 1.39, and 165 JCR papers, she is listed among the World's Top 2% Scientists (Stanford University). Her research focuses on sustainable recycling of composites, reversible bio-based resins, and smart nanocomposites with self-healing, shape-memory, self-heating, and self-sensing functionalities.

Abstract: The Institute of Technologies for Sustainability (ITPS) is positioning itself as a leading center for research and innovation dedicated to building a sustainable future. At ITPS, we believe sustainability is essential to progress, environmental protection, and social well-being. Guided by this vision, we promote projects that integrate science, technology, and innovation to transform both social and industrial sectors.
Our mission is to tackle today's most pressing environmental, social, and economic challenges through initiatives focused on:

> Responsible management of waste and industrial effluents
> Use of recyclable, multifunctional, and eco-friendly materials
> Development of efficient and sustainable technologies
> Promotion of clean and renewable energy sources

These actions support the transition to a circular economy and a low-carbon society, contributing to global goals such as climate resilience and responsible resource management.
Among ITPS's most promising initiatives is the project "Hydrogen, the Fuel of the Future: From Production and Separation, Storage and Transportation, to Energy Generation through Efficient, Safe, and Sustainable Technologies." This research explores hydrogen's full potential as a clean energy vector and develops advanced technologies for its efficient and safe implementation.

ITPS also includes several specialized research groups advancing sustainability and materials science. One outstanding example is the Smart and Sustainable Polymers and Composites Group, dedicated to developing new recycling techniques for composite materials with lower energy consumption. The group also designs smart polymers and composites with innovative properties, such as self-healing, shape-memory, and sensing functionalities, enabling applications in energy, mobility, and environmental engineering.

Through its multidisciplinary approach, ITPS fosters collaboration among researchers, industries, and institutions, promoting technological innovation as a catalyst for sustainable development. With a commitment to excellence and a vision for a cleaner, smarter, and more equitable world, the Institute of Technologies for Sustainability continues to pave the way toward a truly sustainable future.

AI-Based Flow Sensing for Sustainable Aviation: A Step Towards Climate-Resilient Societies

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Short Bio: Aerospace Engineer from UC3M: B.S., 2019 and M.S., 2021. The academic training included international stays at engineering schools in Italy and Australia. PhD (2024, Cum Laude and International Mention), funded by an FPU grant, on AI-based sensing of turbulent wall-bounded flows. His research is reflected in 3 JCR publications and participation in key projects (NEXTFLOW, EXCALIBUR, ACCREDITATION). He is currently an Assistant Professor at Universidad Rey Juan Carlos (URJC).

Abstract: The aviation sector faces growing pressure to reduce its environmental footprint, as it contributes significantly to global greenhouse gas emissions. Improving aircraft efficiency is a key pathway to achieving sustainability goals, and this requires better understanding and control of turbulent flows around aircraft surfaces—one of the main sources of drag and fuel consumption. Enhancing aerodynamic performance through smart, data-driven methods aligns with broader efforts to decarbonize transport and build climate-resilient societies.

AI-based flow sensing techniques have been employed to address the challenge of real-time turbulence estimation for active flow control. Specifically, Generative Adversarial Networks (GANs) can reconstruct complex three-dimensional turbulent flow fields from non-intrusive wall measurements. This approach enables accurate estimation of flow features near solid surfaces, where turbulence is most critical to drag generation.

This method uses a data-driven generative model trained on high-fidelity flow data. Once trained, the GAN can infer instantaneous volumetric flow structures—particularly wall-attached coherent structures—using only wall data as input. These structures play a central role in energy dissipation and drag, and being able to sense them in real time is a critical step toward implementing feedback-based flow control in practical applications.

To assess the reconstruction capabilities of this approach, different wall-based sensing strategies were evaluated. Specifically, sparse spatial distributions of various wall quantities—such as wall pressure, wall shear stress—were used as input to the GAN model. This allowed us to investigate which physical measurements contain the most informative signatures of the near-wall turbulent structures. Results show that certain wall quantities enable significantly more accurate estimation of three-dimensional flow features, highlighting the importance of sensor placement and selection in practical implementations of AI-based flow sensing.

By enabling precise, low-cost flow estimation, this work contributes to next-generation aerodynamic technologies that support more energy-efficient flight. It exemplifies how AI can unlock new capabilities in fluid dynamics, helping aviation meet climate objectives through innovation in sensing and control.

The role of power-to-X technologies in the green transition

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Short Bio: Csaba Janáky was a Marie Curie fellow at the UT Arlington (USA, 2011-2014). He founded a research group at the University of Szeged in 2014, focusing on energy orientated electrochemistry. He published over 130 papers, filed 20+ patents. He is the founding director of the Greennovation Center in Szeged, where 100+ people develop chemical energy conversion technologies. He is co-Founder of eChemicles, a company scaling-up its CO2 electrolysis technology to decarbonize the hard-to-abate sectors.

Abstract: Power-to-X technologies are key to provide both long term storage of intermittent renewable energy, and also essential green molecules for the chemical industry. In this regard, electrochemically generated green H2 and CO2-derived chemicals are of prime importance. The electrochemical reduction of CO2 is expected to play a role in closing the artificial carbon cycle, using a harmful greenhouse gas as feedstock for valuable chemicals. Novel catalysts, electrode assemblies, and cell configurations are all necessary to achieve economically appealing performance. Building on recent achievements, high reaction rate and selectivity can be routinely achieved. In my talk, I am going to present our most recent results on the electrochemical CO2 -to-CO and CO-to-ethylene conversion. I will show how proper cell components and operational conditions result in unprecedentedly high partial current densities in zero-gap cells. I will demonstrate the role of each component of the membrane electrode assembly, such as the catalysts, the porous transport layers, the membrane, and the ionomers. All these factors contribute to the local chemical environment, which builds-up during the electrolysis.

In the second part of my talk, I will discuss flooding, one of the main performance fading mechanisms of CO2 electrolysers, which is vaguely defined, and often used for very different phenomena that cause cell/stack failure. The term itself is also controversial, as a fully wet electrode is often observed after high-performing zero-gap electrolyser cells are disassembled. To resolve this apparent contradiction, we investigated the cation balance in a zero-gap CO2 electrolyser cell operated under different conditions, and also actively controlled cation concentration in the cathode compartment to study its effect on the electrolyser performance. We demonstrated that flooding in CO2 electrolysers is not only related to the excess amount of water in the GDE, but rather to the presence of an electrolyte solution with high enough concentration. To operate the cell efficiently, the electrolyte concentration in the cathode GDE must be kept within an optimal range.

Finally, I will present our scale-up efforts carried out at eChemicles, resulting in an operational CO2 electrolyzer stack with 2500 cm2 single cell area, as well as a containerized prototype system (being validated in various industrial environments).

PS1 - T1

Sustainable solutions in Refrigeration, Heating and Air conditioning

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Short Bio: Nikolaos Barmparitsas, based in Athens, is a researcher and Service Manager with expertise in Renewable Energy and Circular Economy. An NTUA graduate, he combines academic research with industry practice, leading projects on sustainable refrigerant reuse, hybrid heat pumps, and energy storage. Through the Retradeables platform and European Green Deal initiatives, he drives innovation and decarbonization in the HVAC-R sector.

Abstract: Fluorinated greenhouse gases (F-gases), such as HFCs, have global warming potentials thousands of times higher than CO_2. To address this, the EU introduced Regulation (EU) 2024/573, accelerating the phase-down of HFCs and banning high-GWP refrigerants, in line with the European Green Deal and Climate Law.
The circular economy approach promotes recovery, recycling, and reclamation of refrigerants, reducing emissions and resource dependency while encouraging adoption of natural alternatives like CO_2, ammonia, and hydrocarbons.
Cooperation with academia strengthens these efforts through research on low-GWP technologies, advanced recovery methods, and workforce training. Together, legislation, circular economy principles, and academic partnerships drive innovation and support the EU's climate neutrality goal by 2050.

PS1 - T1

PS3 - T1: Adaptaive buildings and infraestructures

Urban parks as climate resilient infrastructure

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Short Bio: Cristina Del-Pozo (BSc, MLA, PhD), Landscape Architect, is Associate Professor in the Spatial and Urban Planning Area at the URJC School of Engineering. She has been Program Director (2016-2023) for the Bachelor´s Degree in Landscape Architecture URJC. She is actually involved in research projects: i) Project Selina EU and ii) Project Green and blue infrastructure for health and wellbeing Madrid Region CMAD-SALUD. She is Expert Evaluator in Horizon Europe and New European Bauhaus initiatives.

Abstract: Climate change is exacerbating global environmental challenges worldwide. The frequency of extreme weather events, including intense rainfall and droughts, is increasing. Urban water systems face challenges from climate change and urbanization, causing flooding and water scarcity (Dąbrowska et al., 2023). Traditional stormwater management approaches are becoming ineffective, requiring new solutions (Larsen et al., 2016). The increasing frequency of droughts and impervious surfaces worsen these challenges. Green spaces are essential for water absorption and cooling cities (Moura et al., 2015). There is an urgent need for innovative urban water management solutions, as traditional systems face constraints. Cities are adopting multifunctional developments, such as resilient parks, to help urban areas adapt to climate change (Purohit, 2024). These parks aim to reintegrate nature into urban settings and combat climate change (Negrello, 2023). They address urban heat islands and enhance usability for citizens (Norouzi et al., 2024).
This needs a landscape approach to park planning and design that enhances ecological services. Parks can be designed as climate-resilient infrastructures, increasing natural habitats and providing recreation spaces. Urban nature provides psychological benefits (Vidal et al., 2025). Parks are critical components of stormwater infrastructure in urban environments (Sushinsky, 2022). They integrate vegetation and water-based elements to manage stormwater and offer multifunctional benefits (Fuentes, 2024). Studies show these infrastructures improve hydrological management (Viteri, 2025), enhance biodiversity, and contribute to social well-being (Sádaba, 2025). Their effectiveness depends on integrated planning, spatial targeting, and cross-sector coordination (Shade, 2020).

We explored innovative design strategies of climate resilient urban parks to improve urban resilience. The methodology involved reviewing climate parks worldwide and analyzing selected parks to understand measure implementation and resilience outcomes.

Case studies revealed innovative strategies and challenges, showing well-designed climate parks can assist cities in mitigating climate change. Results highlight the need for flexible solutions that evolve with climate impact knowledge. Future planning should incorporate adaptive strategies with sustainable funding and policies to improve urban resilience.

Sustainable Building Energy Management and Innovative Vehicle-to-Building (V2B) Connection Infrastructure

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Short Bio: Associate Professor of Energetic and Environmental Systems at University of L'Aquila. Previously ENEA Researcher at Low Environmental Impact Vehicles Lab. His interests are in two major areas: ICEs, with particular reference to the improvement of performance, fuel consumption and pollutant emissions; Energetic systems, with particular reference to the aspects related to the reduction of primary energy consumption and pollutant emissions. Author of more than 80 papers.

Abstract: Depending on the local climate, residential buildings typically require thermal energy for heating during winter and eventually they require cooling during summer. They also need thermal energy for cooking and electricity for lighting. These are the basic energy requirements of a household. In conventional energy systems, thermal energy requirements (for both cooking and heating) are usually met through chemical carriers, an option that is likely unsustainable in the near future. Sustainable energy systems based on RESs will provide significantly more electricity and fewer chemical carriers compared to conventional systems. Consequently, it will become easier and more cost-effective to meet thermal energy needs using electric technologies. Furthermore, electricity can be at least partially generated locally using photovoltaic (PV) panels installed on rooftops. These factors are driving a significant transformation in the technical systems used for energy management in buildings. Additionally, increasing attention to building energy performance has led to the establishment of new standards. For example, the European Union has defined minimum energy performance requirements for all new buildings under construction, which set a maximum allowable fossil energy use per unit of floor area. To meet these requirements, designers must incorporate electricity self-generation (and local storage in BESSs) and enhance local self-consumption through a range of technical solutions.

From this point of view, the frequent connection to the electric grid of cars Electricity Storage Systems (ESSs) may constitute an opportunity, if the implementation of smart and fully bi-directional Vehicle to Grid technologies will be carried on in parallel. Bi-directional capabilities of the network both in physical terms and in terms of management and billing are still very poor and must be greatly increased, in the so-called smart-grid paradigm. Some technological solutions may be already implemented on smaller scales, while vehicle ESSs are connected with individual homes (Vehicle to Home, V2H). The development of optimization systems for energy and economic management of V2H systems becomes crucial.

Way too slow - how to speed up climate adaptation of urban streets

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Short Bio: Christian Werthmann is Professor for Landscape Architecture and Design at the Faculty of Architecture and Landscape at the Leibniz University Hannover. His research focusses on the holistic transformation of public open space in the face of spatial injustice, biodiversity loss and climate crisis in dense urban environments.

Abstract: The transformation of urban streets plays a crucial role in adapting cities to fast pacing climate change. The question is no longer whether streets should be remodeled, but how quickly this can be achieved. Particularly in densely populated residential areas, a fast redesign of neighborhood streets is necessary to cope with the increasing frequency of heavy rainfall events and prolonged heatwaves. However, progress in this regard is unsatisfactory. Alone, in a midsize city of 500,000 residents, like Hannover in Germany, there are hundreds of kilometers of streets in heat islands that are not shaded by trees. If action is not taken soon, more heat related deaths can be expected in German cities.

This leads to the central research question: How can the process of climate change adaptation of streets in densely populated residential areas be accelerated?

In two workshops with the administration of three different sized cities in Germany several key factors were identified in order to advance the transformation of dense urban streets in heat islands: increased political will, more flexible administrational processes, innovative solutions for maintenance of green spaces and effective citizen participation models.

Adaptive Buildings. From Mitigation to Adaptation - a short but critically slow evolution

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Professor in Architectural Technology, School of Architecture, National Technical University of Athens. Director, Sustainable Architecture Lab.

Abstract: Eleni Alexandrou (National Technical University Athens). The Brundlandt report in 1987 clearly stated the need to transform human operations and actions to mitigate their adverse impact on the planet, introducing a broader definition of sustainable development strongly linked and focused on environmental and human protection while ensuring the living conditions of future generations.

The building industry responded to the call by focusing mainly on bioclimatic design and energy efficiency that took a long time to implement on a larger scale of the built environment due to the inactivity of construction practices and procedures. The aim was to mitigate the impact of the built environment on the natural environment. Initiatives that focused on the circularity of construction practices and use of building materials or even the implementation of renewable and biobased materials were since then introduced, responding to the broader sense of sustainability and environmental protection through construction, operation and deconstruction of buildings, but remain very limited.

Twenty years have passed to the UN's 17 SDGS as a desperate and urgent call for action, putting tackling climate change (SDG 13) as a central and key that supports all the actions. Since then, we are all facing nearly as observers, of the transformation of climate change into a climate crisis which further adds to the heavy load that the built environment induces to the natural environment through vicious circles of destruction and rebuild. All the above dictate multifaceted, environmentally friendly practices to ensure resilience to a continuously changing environment through adaptation in all man-made construction.

I will present our research at the Sustainable Architecture Lab as well as through teaching at the School of Architecture at NTUA that has focused for the last 10 years to what we call the "small scale" as we believe that smaller actions and activities are equally important with large scale initiatives since they do not interfere to a great extend with politics, policies and economic mandates that usually slow down processes. Additionally, these efforts give to our opinion a clear understanding to our students, the future generation, as they better comprehend and qualitatively and quantitatively assess the impact of small actions on the overall environmental building (construction and operation) processes with experimental and hands on projects.

Beyond zero emissions: rethinking the urban campus as a resilience hub

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Short Bio: Dr. Irene Koronaki is a Professor of Mechanical Engineering at the National Technical University of Athens, where she also leads the Applied Thermodynamics Laboratory. Her work focuses on thermodynamics, refrigeration, renewable energy, and ways to make buildings more energy-efficient and sustainable. With a PhD and postdoctoral research from NTUA, she has dedicated her career to advancing clean energy technologies and mentoring young engineers and researchers.

Abstract: Our cities are changing faster than ever. They are stretched by the climate emergency by the social inequalities by the strains on resources and infrastructure. Universities, with their blend of expertise, creativity and public credibility, are uniquely well-positioned to inform the evolution towards better urban futures.

Years have been invested in striving for "zero emissions." It's an important benchmark but perhaps the moment is also one to dream beyond that. What if our campuses are not only carbon-neutral but actually life-positive sites, sites that have an active positive influence on their surrounding communities and ecosystem? Imagine the campus producing renewable power, being judicious with resources, sharing access to facilities during emergencies with the neighbourhood. A campus that doesn't end with sustainability but moves toward the idea of regenerating.

In this presentation we will envision the campus itself as an engaged, vital system, a producing, learning, giving-back type of entity. By equating renewable energy, green and blue infrastructure and strong partnerships with the broader community, we are able to design campuses that are microcosms of sustainable, resilient cities. They are where imagination meets compassion where bench science informs bedside practice, and where every gesture, however small, makes a difference for the common good.

Lastly, this is an invitation to re-imagine the role of the university in the global. Not as the administrative fortress seeking efficiency but rather the ethical generative force within the city itself, shaping an alternative future that is sustainable, resilient, interconnected and ultimately human.

PS3 - T1

Infrastructure and Urban Landscape: Principles for the (Re) Integration of Railway Lines and Depots

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Short Bio: Sebastian Sattlegger studied architecture at TU Vienna, where he is now a university assistant at the Institute of Urbanism and Urban Design. His research focuses on the spatial integration of railway infrastructure within urban contexts. In 2020, he received the Austrian Federal Ministry's Start Scholarship for Architecture and Design, and he has previously gained professional experience in architecture and urban development in Austria and various countries in Latin America.

Abstract: High-level rail infrastructure is crucial for sustainable mobility, but it often creates spatial barriers within dense urban environments. While tram and light rail systems can be integrated relatively easily, the operational logic of elevated, at-grade or below-grade railway lines frequently conflicts with fine-grained urban patterns and networks of active mobility.

This research explores strategies for the spatial reintegration of railway infrastructure into the urban fabric, focusing on Vienna as a key case study. The city's railway landscape, which ranges from Otto Wagner's historic urban railway arches to modern suburban and freight lines, illustrates both successful integrations and persistent spatial divides.
The study examines planning and design principles that enhance the permeability of railway corridors by transforming spaces alongside, beneath, and above the tracks into public, ecological, and connective urban elements. It addresses the fundamental tension between maintaining efficient transport operations and preserving the dense, mixed-use urban fabric that depends on accessibility and proximity.

The presentation provides an overview of current research on the relationship between infrastructure and urban design, outlining potential pathways for translating these insights into future interdisciplinary research proposals.

PS3 - T1

PS4 - T1: Building knowledge in collaborations between academia and industry for sustainable development

Smart Tourism & Smart Tourist Destinations: The Case of Spain

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Short Bio: Carmen de Pablos and Miguel Blanco, PhDs, are full-time faculty at Universidad Rey Juan Carlos and members of the OpenInnova Research Group. Their work focuses on the impact of IT on organizational systems, strategic management, and excellence. They contribute to the Erasmus+ Smart WB Project on curricula innovation for climate-smart urban development, promoting sustainable and digital solutions in Western Balkan countries.

Abstract: Spain's Smart Tourist Destination (STD) Program exemplifies how digitalization and AI can drive climate-smart urban change. Through governance, sustainability, accessibility, innovation, and technology, cities like Valencia and Benidorm have pioneered responsive models integrating big data, IoT, and AI to enhance tourism management, reduce environmental impact, and improve residents' quality of life. Valencia, European Green Capital 2024, audits tourism's carbon footprint and promotes sustainable mobility and energy. Benidorm, the first city certified under UNE 178501, uses real-time data and smart systems to balance tourism with urban resilience. These cases offer scalable insights for smart climate cities worldwide.

PS4 - T1

Bolstering engineering-focussed research through engaging stakeholder focus group studies

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Short Bio: I am a Postdoc in Sustainability Science at LUT University's Energy Systems Department, focussed on aligning the built environment with planetary boundaries. I lead research, funding acquisition, curriculum development, teaching, and supervision, and contribute to consortia including IEA Annex 89, Justice in Housing Europe, and Ireland's Build Digital program. My background in BIM and LCA, and over a decade in the construction industry, means I bridge science, policy, and practice in my work.

Abstract: Reinforcing qualitative research with ethnographic (stakeholder-informed) evidence can result in nuanced, end user-focussed research outputs.
In this session we will cover:
> Why to add ethnographic tools to your research arsenal
> Considerations for souring participants
> Designing effective and engaging focus group sessions
> Analysing qualitative (interview transcript-type) data

And if there's time, we'll take a brief look at structuring domain knowledge semantically using ontologies (computer / logic models) – ie. 'Formalising knowledge'.

This can be considered a 'tips & tricks' session which is based on my experience of using the methods during my PhD which is published in the following articles:

Article 1

Harmonised governance-practitioner requirements engineering for built environment sustainability

Article 2

Co-developing a scalable software architecture for Life Cycle Assessment in the built environment

Article 3

Drivers, challenges and opportunities in Information Management according to built environment stakeholders

Although I come at this from a 'built environment' angle, the tools are relevant to any discipline which needs to close the gap between the requirements of stakeholders in policy, practice and research.

Reaching out for young people in university-industry collaboration

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Short Bio: Johanna Naukkarinen holds a M.Sc. degree in chemical engineering , a D.Sc. (Tech) degree in knowledge management, and a professional teacher qualification. She is currently working as an associate professor with the School of Energy Systems at LUT University with developmental, educational, and research interests related to technology and society, gender diversity, engineering education, and engineering outreach.

Abstract: This presentation introduces two innovative approaches to designing work experience programmes that combine university and company activities. The aim is to broaden young people's understanding of engineering jobs and the educational pathways that lead to them. Programmes were developed as part of a project that concluded in the summer of 2025. However, they will continue as part of LUT University's regular activities.

The programme for lower secondary school pupils lasts for two weeks. First, pupils spend five days at the university, then four days at companies, and finally the closing day back at the university. Two different models were piloted for upper secondary education students: a two-day model with one day in industry and one day at the university, and a one-day model where students visited a company in the morning and the university in the afternoon. Although the former was slightly preferred by the students, the latter model was chosen for execution in future due to its greater resource efficiency.

During their time at the university participants are introduced to educational opportunities in technology fields and the academic work at the university. The program includes, among other things, an environmental technology escape room game, making sorbet in the chemical engineering laboratory, and delving into electrolysis under the guidance of an electrical engineering student. Hands-on activities are favoured as they are the most effective way of evoking young people's interest in technology.

In companies, participants gain insights into expert tasks in technological fields by simulating real expert work. In practice, this has involved e.g. manufacturing and testing sheets in a research laboratory, engaging in equipment engineering using SolidWorks, identifying different types of rock, interviewing employees for career stories, and practising project management scheduling using real tools.

Organising a programme is more efficient than receiving individual work placements. In the technology industry, arranging work experience periods can be difficult due to reasons such as occupational safety concerns and a lack of time and resources. In the programme, the time is divided between the university and the companies, which are aided in constructing the programme for their days. This makes it easier for companies to take on interns and gives young people an opportunity to gain insight into engineering work that would otherwise be missed.

Driving Innovation and Accelerate the Green Transition Through Strategic Partnerships

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Short Bio: Kerstin Johansen, professor in Integrated product and production development and the Associate Dean of Research at School of Engineering, Jönköping University has been active as a researcher in more than 30 project linking academia and industry.

Abstract: This parallel session introduces Jönköping University (JU) as a regional academia with close collaboration with industry. The integrated research and educational environment SPARK will be presented with the collaboration model for strategic industrial partners, highlighting the value of such partnerships. One of the strategic partners, Husqvarna Group, provides a real-world example, illustrating the company's motivation and benefits of close cooperation with academia. The session transitions to the purpose of the strategic GRACE project focusing on green transition and its creative approaches to industrial – academia collaboration. Advantages and opportunities that industry sees in working closely with academic institutions will be highlighted.

Competitive advantage based on sustainable value proposition: Role of ecosystem capabilities

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Short Bio: Imran works at Jönköping International Business School in Sweden as assistant professor. His research focuses on business model innovation, creativity and its relationship with innovation. He has published on sustainable business models and now working on more projects related to adoption of sustainability in the firm and its ecosystem.

Abstract: Considering the immense potential of sustainable business models in tackling the broader challenge of corporate sustainability, this project analyze the performance implications of a firm's sustainable value proposition and role of capabilities in the ecosystem of a firm in adopting sustainable value proposition. Based on the analysis of a large panel dataset across different industries, we are analyzing how adoption of sustainable value proposition affects firm performance and how performance pressure from competition is influencing the adoption of sustainability in the value proposition of the firm. Furthermore, role of capabilities of the firm and its suppliers is analyzed during this process.

PS4 - T1

PS1 - T2: EDUCATION - Novel Educational Approaches for sustainable solutions

Higher education for sustainability The challenges ahead

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Short Bio: Paulo Pereira is a globally recognised researcher with extensive experience in Environmental Sciences and Sustainable Development Goals assessment. In 2020, he received the award of a highly cited researcher by Clarivate Analytics, and in 2021, 2021, 2022, 2023 and 2024 he was also awarded as one of the most highly cited and influential researchers in the world (2%) in the field of Environmental Sciences.

Abstract: Higher education institutions need to be in the forefront of Sustainability implementation. They are key to reate the next generation of critical thinkers that shape the world that look at the world in a ballanced way, integrating equally environmental, societal and economical interests. This is not easy to implement, nevetheless, challenges is what makes us growth as socitey and the crises that occurred should make us stronger. Recent (COVID 19) and current crises (e.g., geopolitical context, war, migration) putted even more challenges to the higher institutions establish sustainability principles due to the existence of a polarized society. In any case, higher institutions should establish themeselves as a societal transformative agent and promote sustainable principles and create critical thinkers that are concerned with the more prosperous and equitative world. This is the way to go…

LUT University Climate Action Massive Open Online Courses

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Short Bio: Michael Child (D.Sc, Tech.) is an Associate Professor at LUT University Department of Sustainability Science. Current research focuses on organizational and university carbon footprint calculations, climate actions and carbon handprint. Teaching activities include courses on climate solutions and sustainability-oriented project work. Administrative duties include acting as Head of LUT University's Bachelor's Programme in Technology and Engineering Science.

Abstract: LUT University has designed a series of Massive Open Online Courses (MOOCs) that aim to turn climate anxiety into effective climate action. Currently, there are 3 English-language MOOCs aimed at upper secondary or bachelor's level students: Solutions for Carbon Neutral Transport, Power to X, and Sustainable Design and Manufacturing. There is also one MOOC aimed at youth aged 12-14 (Climate Action - For Youth). Under current development is a MOOC related to Carbon Handprint.

LUT MOOCs aim to develop a sense of agency. Especially younger students can feel overwhelmed by media messages of doom and gloom related to a variety of environmental issues. This type of anxiety often results in a reduced perception of being able to contribute to solutions. The Climate Action MOOC series aims to give everyone the knowledge, skill and confidence to engage in climate action and live more sustainable lives. They also aim to confront the barriers to effective environmental action more honestly.

LUT's Climate Action MOOCs have reached thousands of students around the world since 2020. The platform ensures learning at the student's own speed, anywhere, anytime, on any device, and all for free.This presentation will share insights into the creation and maintenance of the LUT MOOCs over the last five years, including advice for anyone considering similar course creation.

A proposal will be introduced which invites member universities of EULiST to develop a common MOOC related to sustainable sustenance. Food services on our campuses allow for climate actions to be made each day, and our ability to enable sustainable food choices is potentially very great.

Paving the way towards sustainability: transforming knowledge of the circular economy among university students

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Abstract: Young people are aware of environmental problems but often lack knowledge of strategies to address these problems, such as the circular economy (CE). Universities have a key role in fostering this understanding. This study has two aims focused on university students: i) fostering CE knowledge through fieldwork in companies; and ii) examining how degree programme and gender influence their learning. From January to July 2024, 138 students from four programmes at a Spanish public university took part in a purposive study. They completed a theoretical and practical task exploring firms' intentions to adopt CE and assessed current circularity in Spanish companies. Students reported better knowledge of CE and greater awareness of its level of adoption in Spanish firms. They also felt able to explain the CE concept to others. Students in the double degree in Business and Tourism struggled more to reach tour operators than their peers in the double degree in Economics, Business and Law did with firms in other sectors. Women reported larger gains in practical CE understanding than men. These findings show that CE literacy can grow while simultaneously building curricular skills and preparing undergraduates as change agents.

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Keywords: circular business model, sustainability, circularity, higher education, sustainable learning, future generations.

Beyond Carbon Footprint in Education and Research - Learnings from the Development of Course Curriculum in Sustainability Assessment

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Short Bio: Venkateshwaran Venkatachalam is a sustainability researcher, whose research focus lies in the integration of ecodesign and sustainability assessment. He has been working as a researcher in the field of sustainability assessment since 2016 and holds a doctorate degree from the Leibniz University of Hannover (LUH). He has been teaching Sustainability Assessment to the students at LUH since 2020 and is also a part of the project at LUH that performs LCA for Higher Education Institutions.

Abstract: With an exponential increase in the negative impacts of climate change experienced globally over the last few years, industries and governments collaborate with different educational and research institutions to develop measures for climate resilience and mitigation. It has become imperative to educate students and industry professionals on the direct and indirect effects of Climate Change and Sustainable Development so that they can understand and implement those measures in their industries or once they join the workforce. Even though the Higher Education Institutions (HEI) have addressed the core issues of Climate Change and Sustainable Development by giving a strong emphasis on reducing Carbon Footprint and increasing resource efficiency for different products, there remains a challenge in giving the students a holistic understanding of how to analyse and conduct Sustainability Assessment. Especially, there is a huge potential when it comes to teaching the students as to how to communicate the sustainability performance of products and how to develop new design strategies and sustainable business models. Based on the experience gathered over the years in teaching the students the basics of environmental sustainability, the Institute of Plastics and Circular Economy (IKK) was assigned with the task of developing a curriculum for a compulsory course in the summer semester of 2025 on how Sustainability Assessment is conducted in industries and research in reality. This course was targeted towards the bachelor's and master's students in Sustainability Engineering at the Leibniz University of Hannover. The different aspects of the course curriculum along with the short and long-term impacts of providing such an expertise to the students will be presented in this study. Moreover, the different tasks that were given to the students as exercises to make them understand the complexities of sustainability assessment beyond the calculation of the carbon footprint of products will be discussed in this study. Finally, the challenges and learnings in building and organizing such a course on Sustainability Assessment were assessed and will be listed in this study.

PS1 - T2

Case study: IMT Convergence Challenge 2025 An Innovative Experiential Learning Model for Sustainability and Interdisciplinary Collaboration

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Abstract: The IMT Convergence Challenge is an innovative experiential learning program organized annually by the Institut Mines-Télécom network.

It brings together engineering students from several IMT schools, in collaboration with industry partners and territorial stakeholders, to address real-world challenges related to ecological and societal transitions.

The 2025 edition, held in Sète over four days, focuses on the theme: “Sea Tech & Blue Economy.”

This edition tackles issues related to marine sustainability, circular economy, territorial resilience, and responsible innovation.

Pedagogical Objectives and Approach:

The Challenge adopts a flexible and immersive learning approach based on project-based learning, addressing real-life problems proposed by companies and institutions, and interdisciplinary teamwork supported by coaches and experts.

- Throughout the challenge, participants benefit from theoretical inputs and practical immersion through expert talks, site visits, ideation workshops, and prototyping sessions.
- This active pedagogy fosters critical thinking, creativity, and meaningful engagement of students in ecological transitions.

Integrating Green Chemistry Competences into University Curricula: Responding to Global Challenges

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General Secretary of the European Chemistry Thematic Network, and member of the Network’s Working Group on Sustainability. Active in Erasmus+ projects, promoting green competences and educational innovation across Europe.

Abstract: This contribution presents an educational model developed within the European Chemistry Thematic Network Working Group on Sustainability, involving EULiST partners Universidad Rey Juan Carlos, TU Wien, Slovak University of Technology in Bratislava, and University of L’Aquila. It aims to strengthen sustainability and circularity competences in chemistry education, aligned with the EU Green Deal and GreenComp. Objectives include defining key green chemistry competences, developing digital and modular learning tools, and promoting interdisciplinary, research-informed teaching. The model integrates green chemistry, bioeconomy, and life-cycle thinking. At the European level, it will support convergence in sustainability teaching and shared educational standards. For the EULiST consortium, it will enhance academic cooperation, resource sharing, and the development of joint educational strategies to prepare students and academics for the green transition.

PS1 - T2

Service Learning and Sustainability in Engineering Education

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Abstract: The "ReciclandoURJC" project empowers engineering students to co-create sustainable solutions through service-learning. Addressing the real-world challenge of campus waste management, students from various engineering disciplines design solutions for solid waste treatment, aligned with Spain's Circular Economy Law. In collaboration with the university's Green Office, the students lead awareness campaigns, propose technical solutions for waste valorization, and develop systems for bioenergy and bioproducts. The results of this project show a significant acquisition of social and technical skills, and a measurable impact on waste separation and community awareness. This experiential model fosters interdisciplinary teamwork, civic responsibility, and climate-conscious innovation. The project demonstrates how higher education can drive social impact and environmental resilience by equipping future engineers with the skills and mindset to lead the transition toward sustainable and inclusive societies.

Teaching sustainability in universities: What works? A systematic review of waste reduction strategies

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Short Bio: Assistant Professor, PhD researcher on topics related to Circular Economy and speaker at national and international conferences on this subject.

Abstract: This paper presents a systematic review of educational initiatives implemented in universities to promote waste reduction. Using the PRISMA methodology, it analyzes publications indexed in the Web of Science, Scopus, and Dimensions databases, focusing on interventions grounded in active methodologies, experiential learning, and interdisciplinary approaches that foster sustainable competencies. The study identifies best practices implemented in real university settings that have shown measurable impacts on environmental awareness, behavioral change, and student commitment to sustainability. The review provides a transferable framework for integrating these initiatives into higher education curricula, highlighting the transformative role of educators as key agents in building more resilient and sustainable societies.

PS1 - T2

PS3 - T2: Urban transformation and circularity: Regeneration, re-use, transformative governance

Circular Opposites? Designing with Timber and Earth Across the Reuse-Recycle Spectrum

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Short Bio: Jakobus Schwarz is a registered architect and research associate at the BMLUK Endowed Professorship for Timber Construction and Design in urban Space at Technische Universität Wien. His research focuses on material-based design, circular construction, and the reuse of excavated earth in multi-storey timber buildings, linking architectural practice, teaching, and research in Vienna.

Abstract: While circular construction is often discussed in the context of recycling technologies or life-cycle efficiency, this article approaches this topic using two bio-based building materials that embody fundamentally different circular strategies: wood and clay.

As part of the BMLUK Endowed Professorship for Timber Construction and Design in Urban Spaces at TU Wien, current research is investigating, among other things, how these contrasting materials can enable complementary regeneration pathways.

Wood represents a cascade-based strategy: its strength, renewability, and modularity enable multiple use scenarios across different functions – from primary structures and secondary components to fiber-based recycling and ultimately thermal recovery. The key to extending these cascades lies in planning for disassembly, reversible connections, and digital traceability. This ensures that each element remains identifiable and reusable throughout building generations. Such an approach translates regeneration into long-term resource management within an evolving urban fabric.

Earth—and especially excavated earth—can follow a closed-loop strategy. As a non-scarce but underutilized urban byproduct, it offers the potential for complete material regeneration: Earth components (if uncontaminated by cement or similar stabilizers) can be rehydrated, reshaped, and reused indefinitely without loss of substance or performance. This stands in stark contrast to the finite cascades of wood. To realize this potential, however, regulatory frameworks, logistics chains, and the connection between excavation, construction, and local craftsmanship must be reconsidered.

By positioning wood and earth as “circular opposites,” the research highlights two distinct temporalities of circularity:
> Wood embodies durability and continuity, a strategy of extended use and reuse;
> Earth embodies reversibility and renewal, a strategy of complete material recovery.

Between these poles lies a spectrum of hybrid approaches, such as wood-earth composite systems manufactured on-site in “field factories.” These demonstrate how reuse and recycling logics can be physically and organizationally integrated—combining the precision of wood materials with the regenerative properties of local soil.

Situating these material investigations within the wide framework of urban regeneration, the contribution proposes a pluralistic, design-oriented understanding of circularity rather than seeking a universal model.

Circular Transformation in Vienna

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Short Bio: Since August 2022, Bernadette Luger is head of the Coordination Unite for Resource Conservation and Sustainability in Construction within the Executive Group for Construction and Technology of the City of Vienna. In this role, she is responsible for leading the “DoTank Circular City Vienna 2020–2030” (DTCC30), an implementation programme dedicated to developing and coordinating measures for establishing a circular economy in the construction sector.

Abstract: In Vienna, the transition towards a circular built environment is understood as a systemic transformation process – one that connects material cycles with social, economic, and cultural innovation. Within the City Administration, the “DoTank Circular City Wien 2020–2030” (DTCC30) implementation programme coordinates this shift from a linear to a circular system in planning, construction, and renovation. Its mission is to make circular construction the standard in Vienna by 2030. This ambition is not driven by ideology but by evidence and necessity: the construction sector accounts for around 40% of global CO_2 emissions and consumes vast quantities of finite resources. Addressing this challenge means rethinking how cities build, use, and regenerate their spaces.

DTCC30 structures the transformation along five interlinked fields of action: raising awareness, developing definitions and standards, testing circular solutions in practice, adapting governance frameworks, and fostering cooperation across disciplines. This process-oriented and iterative approach recognises that transformation cannot be implemented top-down; it must evolve through experimentation and learning in real urban contexts.

To operationalise this, Vienna relies on diverse instruments such as the “Zirkularitätsfaktor” (Circularity Factor), which provides measurable indicators for circular design and construction, and Urban Living Labs that serve as experimental environments for testing regeneration and reuse strategies. These projects activate spaces, foster collaboration among public, private, and academic actors, and explore how circularity can enhance social inclusion, resilience, and quality of life.

In this sense, Vienna’s circular transition connects urban regeneration with ecosystemic thinking. By linking material reuse and prolongation with participatory and design-driven approaches, the city aims to regenerate not only buildings but also communities. Circularity thus becomes a lever for urban transformation – enabling a liveable, climate-neutral, and equitable future within planetary boundaries.

Circular Design for Urban Transformation

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Abstract: A focus on urban transformation is at the core of the work of the Circular Design Innovation Alliance (CiD). At the interface between the city, circular economy, and anew understanding of design - beyond aesthetics and crossing between disciplines – CiD brings together approaches in re-use and re-cycling with bio-based and bio-innovated materials. By targeting urban transformation, CiD aims at new linkages between urban design, planning, governance, involvement of stakeholders and citizens, organisation of change processes, and to connect them in a new way to architecture, product and service design, to territorial innovation and bioregions—as well as to material sciences, social and economic sciences, and engineering. This wide interdisciplinary setup is carried forward by the 11 partners of the Innovation Alliance, coordinated by Leibniz University Hannover and including, e. g., IAAC Barcelona, Materiom Ltd., Tallinn Business Incubator, and the Architects' Council of Europe. The work is supported by Europe-wide and local Observatories with 100 stakeholders and experts from research, enterprises, public bodies and NGOs. CiD operates on three levels: the co-creation of knowledge on circular design, the set-up of an innovation ecosystem for circular design, and educational innovation in academia, green entrepreneurship, and continuous learning and upskilling. Overall, CiD addresses structural change in the city and processes of change, the activation and engagement of stakeholders, new economic perspectives in combination with the new qualities and cultural expression of public, community, and private spaces.

Climate neutrality, adaptation, urban circularity and the challenges of transformation

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Former MEMBER of the EUROPEAN PARLIAMENT 2012 – 2014. Regional Councillor in South Aegean (2010-2014)
Founder of a number of citizens initiatives and civil society' organisations
Member of the official list with certificated trainers on environmental issues created by the Greek Minister of Labour

Abstract: he City of Athens is a EU Mission city for climate neutrality (NetZero City). We participate in pioneering cities with an ambitious Climate Plan. As Athens is a climate hot spot, we wanted to promote an ambitious Climate Plan, although we know there are difficulties, problems, obstacles.

Our Climate Contract and Climate Investment Plan are both a political commitment for an active role of the municipality in the transition process, and also a commitment to succeed in climate neutrality together with the civil society, research centers, universities, professional organisations and youth. There is a strong social dimension in the plan. It is a tool for social policy, climate and social justice. Therefore, many organisations, universities, professional unions, social and environmental organisations participated in co-design and have co-signed both of them.

We build up a close collaboration with other cities to share experiences and tools . We need the collaboration with universities in promoting a fair and innovative green transition of the city. We have established a Climate Forum and a Youth Climate Assembly. We are creating a Council for Climate Investments. Research, innovation, education.
Challedge: Achieving the goals with active intervention by the Municipality and the society: Energy production from RES by the Municipality and citizens (energy investments, energy community), saving energy with the support of a municipal "Energy - Efficiency" plan, zero waste strategy, circular economy, zero pollution action plan, Nature-Based Solutions. sustainable mobility, energy efficient municipal housing.

Connecting mitigation and adaptation. Reducing emissions while enhancing resilience (adaptation)

PS3 - T2

Circular Territories: Design, Resilience and Social Transformation in São Paulo, Brazil

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Abstract: Based on experiences in São Paulo, Brazil — in peri-urban areas, favelas, and buildings occupied by housing movements — this presentation argues that circularity is a driving force for urban transformation and social resilience. It examines how design can regenerate material and social fabrics, showing how communities build adaptive systems of production, reuse, and care in the face of scarcity, inequality, and environmental degradation.

In the peri-urban fringes of Brazil's largest city, the Ligue os Pontos Program promotes agroecological networks and local production initiatives that foster circular economies, reconnecting food systems, the environment, and community life, redefining the relationship between countryside and city. In Jardim Colombo, an informal settlement within the Paraisópolis Complex—one of São Paulo's largest favelas—the Fazendinhando Institute integrates circularity as part of everyday creativity: construction waste is reused to improve collective spaces, transforming degraded areas into community gardens, gathering places, and small public facilities. In central São Paulo, the 9 de Julho occupation, organized by a housing movement, expands the meaning of circularity: spaces and materials—furniture and objects—are repurposed for new uses, while abandoned buildings become laboratories of coexistence, self-management, and social innovation.

By articulating these diverse territories, Circular Territories proposes a relational understanding of circular design that interweaves ecological, material, and human cycles across scales. These acts of reappropriation express new forms of resilience and solidarity through which the city is continuously rebuilt from below. Such experiences contribute to positioning São Paulo as a living laboratory of circular transformation—where community-based practices, public programs, and design innovation converge to envision regenerative futures. In this context, circularity transcends technical efficiency to become a cultural and political practice that produces resilience through collective imagination, social inclusion, and environmental justice.

PS3 - T2

PS4 - T2: Building knowledge for sustainable practices in collaboration between universities, funding agencies and NGOs withing and beyond EU

Platform model for comprehensive company collaboration

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Short Bio: Dr. Petri Ajo is the Chief Growth Officer of LUT University. His background is in product and business management in chemical engineering industry and he joined LUT University in 2022. Dr. Ajo's role in the university is to support growth through stakeholder collaboration and new initiatives. His duties include composing new ways of industry collaboration to boost the university's positive impact.

Abstract: LUT University has strong roots in industrial collaboration. The university has been growing substantially over the past decade and evolved into an agile entity that continuously develops its ways to create value to its partners. LUT Company Platforms is a new form of company cooperation that harnesses the university's whole offering and expertise to serve industrial needs and bottlenecks in future business landscapes. Many discoveries from research achieve their true impact through industrial application and scale-up through business. Businesses in turn face many bottlenecks that can be technological, business-related or societal, while it can be challenging for a strictly focused enterprise to identify and address these bottlenecks. These challenges can be scrutinized through engineering professionals, economists or scientists of the social and communications domain, yielding different kinds of perspectives for opportunities and solutions. LUT Company Platforms was developed to bring challenges and conceivable opportunities from companies to meet the multi-disciplinary expertise and ideas stemming from the research groups from any discipline. This model has proved extremely flexible and fruitful in turning ideas into projects. We often refer to this as the deepest way of company collaboration.

Beyond the EU Border: Building Accountable Cities through University–NGO–Funder Collaboration

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Short Bio: Timur Uman is Academic Provost and Professor at Jönköping International Business School. His research spans accounting, auditing and governance, with emphasis on hybrid and municipal organizations. He leads Swedish Institute–supported university–municipality partnerships to strengthen structured education, accountability and crisis-ready local governance. He is affiliated with SSE's Center for Security and Resilience.

Abstract: This presentation distills lessons from three university–municipality partnerships that build accountable local governance through structured education and co-production. First, the MCAD collaboration with Konotop, Ukraine shows how short, modular training for civil servants—co-designed with local leaders—can accelerate crisis-responsive planning and transparent service delivery. Second, the GAAP initiative with the Sumy Region, Ukraine demonstrates how regional platforms align university expertise with municipal needs to standardize accountability practices across jurisdictions. Third, the Young Professionals Program targets young civil servants preparing for EU accession tasks, combining structured training, mentoring, and problem-based projects on public financial management, integrity systems, and evidence-based policy.

Funding pathways include Swedish Institute instruments supporting collaboration within and beyond the EU, alongside national/state co-funding lines to support mobility, placements, and digital learning objects. Emphasis is placed on practical consortium design with municipalities and companies to implement, adapt, and sustain accountability-oriented education and governance improvements.

Co-Creating Regional Vitality: How Universities Drive Sustainable Growth Beyond Borders

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Short Bio: Ding Ma serves as the Director of Economic Development for the City of Lappeenranta, Finland. With a strong background in regional vitality development, Ding focuses on fostering business growth, strengthening the city's international visibility, and advancing collaborative initiatives that connect academia, industry, and the public sector to drive sustainable regional development.

Abstract: Building sustainable and resilient regions requires more than innovation! This presentation explores how the City of Lappeenranta, in close partnership with LUT University and other regional and international actors, has turned knowledge into vitality through practical cooperation models. By linking university expertise with business development, city strategy, and international networks, Lappeenranta has become a living example of how local and global collaboration can accelerate green transition and sustainable growth.

Building Knowledge from and to Energy Access and Digitalization Projects in Global South

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Short Bio: Antti Pinomaa is Associate Professor in Electrical Engineering, School of Energy Systems at LUT University, Finland. He graduated as D.Sc. (Tech.) in Electronics from Lappeenranta University of Technology, 2013. Since, he has been working as a project manager, principal investigator and researcher in various research projects on smart energy systems at LUT. Currently, he runs and coordinates research group with aim to build Africa electrification and digitalization related project ecosystem.

Abstract: Research team at Laboratory of Electricity Markets and Power Systems has been running energy access and digital inclusion research and capacity building projects in Global South since 2018. Having strong background in research on smart grids and microgrids in Finland context, we have extended our expertise to developing countries electrification by off-grid micro/mini-grids powered by renewable energy (RE) based solar photo-voltaic (PV) and battery energy storage (BES) systems, as well as standalone solar home systems (SHS). These solutions are delivering energy access to previously off-the-grid unconnected communities.

We have been involved either as a coordinator or partner in several Global South project consortiums funded by various national and international programs. The consortiums have varied from industry-academia, purely research-based run by universities and research institutes, to ones also including NGOs and government bodies and ministries. So far, we have run Global South projects in Africa with our international partners from multiple European and African countries, including Estonia, UK, Belgium, Germany, Italy, France, Spain, Portugal, Algeria, Nigeria, Ghana, Ethiopia, Kenya, Rwanda, Uganda, Zambia, Namibia and South Africa.

The research themes to solve the energy access challenge in Global South cover technical design, dimensioning and piloting of off-grid RE-based solar PV-BES systems, with analyses of the socio-techno-economic impacts, energy projects have delivered to the rural communities livelihood. Research thematic areas on new innovative business models and energy demand prediction modelling tools are also covered. These all are essential in designing and delivering economically viable and sustainable as well as scalable energy access to all.

Data collected from our projects' pilot systems (IoT) and local communities (surveys and questionnaires), as well as understanding the local context and surroundings are crucial to carry out research and get valid research results. Thus, open communications and knowledge sharing with the local project partners and all stakeholders involved are utmost important. Crucial aspects in successful collaboration are to get understanding of the local culture, those differences and working practices among partners. In this talk, through practical examples and findings from our previous and on-going projects in Global South, these elements are addressed, as well as new project ideas are shared.

Stronger together: bringing Science, Technology and Innovation closer to society. The madri+d network

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Short Bio: Susana Pérez holds a BSc in Chemistry (UCM), a MSc in Science and Technology Journalism (UC3M) and MSc in History of Science and Communication (UMH). Since 2010, she works at Fundación para el Conocimiento madri+d being Head of Unit since 2023. She coordinates the participation in the European project "MSCA&Citizens", the Science and Innovation Week, the Science Fair, the International Day of Women and Girls in Science, and the improvement of the Spanish scientific terminology on Wikipedia.

Abstract: Fundación para el Conocimiento madri+d is an initiative of the Regional Government of Madrid created in 2002 to contribute to make the quality of Higher Education, Science, Technology and Innovation key elements of the competitiveness and well-being of citizens.

Its Scientific Culture Unit promotes the dissemination of Science, Technology and Innovation and fosters scientific vocation and entrepreneurial spirit among young students, without gender barriers, through the organization of outreach activities, such as the Madrid Science Fair, the Madrid Science Week, the "MSCA&Citizens" projects and the International Day of Girls and Women in Science.

In the Region of Madrid, the key to promote Science, Technology and Innovation to society is joining forces, creating a network and collaborating among different institutions: universities, research centres, museums, entrepreneurs and NGOs. In this session we aim at sharing our experience and knowledge from the past years bringing Science, Technology and Innovation closer to society. We truly believe that we are stronger together.

PS4 - T2

PS1 - T3: CONNECTING education and research in climate resilience

The Fuenlabrada-URJC Chair: A Living Lab for Circular Economy

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Short Bio: Jovita Moreno holds a PhD in Chemical Engineering (2005, URJC). Associate Professor of Chemical Engineering at URJC, her main areas of research focus on developing innovative technologies for waste valorisation and assessing them from a life cycle perspective. She has authored over 50 scientific publications and has led several national and international research projects. Since February 2022, she has been the Head of the Chair on Circular Economy for Sustainable Waste Management.

Abstract: Established nearly four years ago by the Fuenlabrada City Council and Rey Juan Carlos University, the Chair on Circular Economy for Sustainable Waste Management represents a strategic commitment to enhancing waste recyclability through education, outreach and research. This initiative builds on the strengths of both institutions, combining the university's scientific and educational capabilities with the municipality's extensive practical experience and knowledge of waste management.

The Chair aims to apply the principles of the circular economy to waste streams that are currently characterised by low recyclability. Through research, development and innovation, the Chair promotes new or improved value chains for these materials.

Over the years, the Chair has proven to be a powerful catalyst for collaborative projects involving URJC faculty and students, as well as professionals from various industrial sectors and public institutions. These collaborations foster effective knowledge transfer and help align academic research with the evolving needs of the local socio-economic environment.

PlayInn Plazas: Youth-Driven Innovation for Sustainable Public Spaces

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Short Bio: Associate Professor in the Area of Design at URJC. Architect from ETSAM, 2002, and PhD Architect from UPM, 2016.

Coordinator of the PENT(h)A research group and member of the Matrices subgroup, where they explore the role of women in architecture, their recognition, the parameters and records for their valuation, and urban life, editing Arquitectura con Arquitectas and Coordinator of the CUIDARQ Teaching Innovation Group. Researcher at VIVIDA and Principal Investigator at PlaYiNN.

Abstract: PlaYInn, Plazas for Youth Innovation, is a co-creation initiative funded by EIT Urban Mobility under the framework of the New European Bauhaus. It engages university students, local youth, and municipal actors in the transformation of public spaces through playful, participatory design. Framed within a service-learning methodology, the project fosters interdisciplinary collaboration and mutual learning while addressing real urban challenges. Students act as facilitators and researchers, co-developing sustainable interventions that reflect community needs and aspirations. The initiative functions as a living lab, combining research, education, and civic engagement to promote inclusive and resilient urban environments.

Creation of teaching materials on heat pumps and hydrogen technology. Connecting Universities - Vocational Schools - Manufacturers

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Abstract: The European GreenVOCnet project aims to bring together three worlds that are not always as close as they should be: universities, vocational schools (VET), and the manufacturing industry. Specifically, the topic chosen for this is training on heat pumps and hydrogen technology.

The project is funded by the German Government through the EUKI initiative and involves institutions and organisations from Germany, Slovakia, Greece and Spain.

The main activity is the development of two market-driven certified training concepts (green hydrogen and heat pumps combined with renewable energies), tailored to the specific needs of each country through the use of artificial intelligence and digital and virtual support tools.

This training is aimed at VET Trainers and Teachers and VET Students and University Students.

The project began in November 2023 and will end in March 2026. So far, we have achieved the following results: 49 training modules developed by an international team of experts, available in the three countries in their respective languages and adapted to different target groups/MEC levels.

2 MOOC courses on general fundamentals.
5 MOOC courses on heat pumps.
1 MOOC course on green hydrogen.

72 teachers from the three countries have been trained using the MOOC course materials, enabling them to incorporate the content into their classes.

Creation of networks of VET teachers with local companies.

Motivational campaigns to encourage 400 students to pursue a career in selected green technologies.

The project developed digital and AI based support tools to facilitate international knowledge exchange and transfer between Universities, VET Institutions and Companies:

- VR Applications: Virtual Heat Pump Lab for immersive experiments and digital twins of heat pump systems and VR-Simulator for Refrigeration Systems, offering immersive experiences of the technical equipment.
- Opentropy Platform: Collaborative web platform that connects users and real-world cooling, air conditioning, and heat pump systems, focused on practical training and applied research. Connects university laboratories digitally, enabling VET students to access and use equipment remotely.
- Edu-Transformation AI: Adapts curricula automatically to linguistic, cultural, and qualification levels – enhancing knowledge transfer, scalability, and inclusive access to digital learning across countries.

PS1 - T3

Advances in Digital, stable and flexible electric networks program

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Abstract: Following the Sustainable Development Goals (SDGs), Directive (EU) 2023/1791 of the European Parliament and the Council on energy efficiency and the Integrated National Plan of Energy and Climate (PNIEC), the European Union is committed to move to a decarbonized energy model with significant transformations in energy generation and consumption to reduce greenhouse gas emissions. The measures adopted seek to reduce peak energy consumption, lower the price in the wholesale market, accompany the growth of renewable generation and guarantee the supply security at the local level.

This contribution is to present the principal outcomes of the first year of PREDFLEX project (TEC-2024/ECO-287), funded by Madrid community. The project aims to develop and implement an intelligent system for energy monitoring and management in medium and low voltage electrical grid, facilitating the transition towards greater electrification and the integration of photovoltaic plants, electric vehicles and electrolyzers. The project is aligned with track A topics: Renewable energy technologies (solar energy) and Energy conversion and storage systems, relying on Virtual Power Plants (VPPs) and Digital Twins (DTs). Then, impact of the project in education will be detailed.

PS3 - T3: Digitalisation and AI for urban change: Responsive solutions for smart climate cities

AI-based monitoring of land cover change using r emote sensing data

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Short Bio: Franz Rottensteiner is an Associate Professor at the Institute of Photogrammetry and GeoInformation at the University of Hannover. After studying surveying, he received a Ph.D. degree and a venia docendi in Photogrammetry from TU Vienna. He has pbulsihed more than 200 papers on Photogrammetric Image Analysis, more than 50 of them in peer-reviewed journals. He received the Karl Rinner Award of the Austrian Geodetic Commission in 2004 and the Carl Pulfrich Award for Photogrammetry in 2017.

Abstract: Monitoring the development of land cover over time is an important requirement for understanding the effects of climate change on our environment. This contribution discusses recent developments in this field due to the increased availability of remote sensing data and new AI-based methods. Satellite image time series such as those provided by Europe's Sentinel-2 mission allow for a dense monitoring of processes with revisit times of 5 days at a spatial resolution of 10 m. On the other hand, time series of geospatial data such as aerial images and topographic maps allow for a look into the past 250 years at a higher spatial resolution though with larger time intervals. In both cases, artificial neural networks are well-suited for obtaining information about the land cover and its change over the observed timespan. This contribution focuses on methodological advances and recent results for the two mentioned scenarios. In the first one, multi-temporal classification of Sentinel-2 time series for obtaining time series of land cover maps is presented, showing the potential but also the limitations of current methods, the latter being related to the relatively low spatial resolution. In the second scenario, the integration of aerial imagery and maps for land cover classification is discussed. The use of scanned maps offers the potential to improve the classification results and to obtain longer time series, though with respect to a reduced set of semantic classes. In this context, the current state of development in a project related to this task will be presented.

Promoting Sustainable Mobility Through Digitalisation at Higher Education Institutions. Experiences and Initial Results from the DiNaMo Project

Jonas Koch
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Short Bio: Jonas Koch began his career in 2018 as a consultant specialising in mobility transition and sustainable urban and rural transformation. In 2021, he commenced his PhD at the Leibniz University Hannover (LUH), focusing on mobility justice, digital mobility transformation and education for sustainable development. Since 2024, he is part of the Green Office at LUH, coordinating the collaborative project Digitalisation for Sustainable Mobility (DiNaMo).

Abstract: Transformative change in the transport sector is crucial to achieving the set climate mitigation goals. While teaching and research are important parts of sustainability efforts at higher education institutions (HEIs), these institutions themselves need to become sustainable organizations. Mobility significantly contributes to greenhouse gas emissions at HEIs; therefore, promoting sustainable transportation for commuting and business travel is essential. Digitalisation drives the current mobility transition, supporting sustainable mobility behaviour. HEIs should leverage digital tools to enhance the appeal of sustainable mobility. The DiNaMo project aims to promote sustainable and active mobility through digital services. The four participating HEIs in Hannover act as living labs for developing and researching new digital mobility ideas. The results of our mobility survey and initial experiences of implementing digital solutions for sustainable mobility will be presented at the conference.

City Information Models and Digital Twins – Weighing the Pros and Cons. Between Utopian Visions of the Future and Difficult Choices in the Present

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Short Bio: Lucas Reckhaus is a doctoral researcher at the Urban and Regional Research Unit (SRF), Institute of Spatial Planning of the TU Wien.

Currently he is researching the spatial distribution of critical infrastructure in Austria, assessing for vulnerabilities, and uncovering interdependencies using knowledge graphs. He focuses on GIS analysis, digital twins and artificial intelligence.

Abstract: There is a common utopian vision of the city of the near future. Above all it exists in equilibrium. Municipal agencies share data through a city information model. Formerly disparate datasets are thereby integrated into a centralized repository, while simultaneously maintaining the daily operational autonomy of agencies. Through this digital twin, agencies are automatically informed of material problems, planning conflicts, and imminent critical threats. An underlying knowledge graph structure streamlines the understanding of cascading effects through the system. It also enables timely communication between key operatives, and swift assessment of viable solutions. Through this technocratic system, conflict resolutions are more equitable, from the citizen up to the heads of city agencies.
But how realistic is this vision? Innovation over time is inevitable and prudent. However, changes to working systems need to be carefully planned. They also need to reflect the historical development of specific urban technical-political constellations. Changes that happen too quickly, and are reliant on over-optimistic scenarios, can have disastrous consequences. They risk throwing into question the very trust in governance, which technical innovations are meant to enhance. City information models also carry security risks. The more systems they integrate, the bigger targets for sabotage they become, and the more devastating the consequences of a security breach.

Currently, the private sectors is leading much of the development of city information models and digital twins. This is a result of their complexity and associated costs. It also means products are increasingly standardized, as vendors seek to sell their service to as wide a range of clients as possible. When a city decides on an external product or service, it commits significant financial capital, and ties itself to a long-term solution, whose continued development and support is not guaranteed. While large cities have more leverage in negotiating these terms, medium and small cities are faced with increasingly difficult choices. They must mediate limited financial resources, new operational and legislative requirements, and the risks of commitment to a single provider.

The Dynamics of Shared Mobility: From Activity Patterns to System Requirements

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Short Bio: Dr. Dimitris Papanikolaou is an Assistant Professor in the School of Architecture at NTUA. He investigates the application of information and communication technology in architecture, urban logistics, and human ecology. He is the founder of the Urban Synergetics Lab and Editor of Issue “Interconnect” of TAD Journal (ACSA). He holds a Doctor of Design (DDes) from Harvard University, two MSc degrees from the Massachusetts Institute of Technology, and a Diploma in Arch. Engineering from NTUA.

Abstract: Mobility on Demand (MoD) systems utilize shared vehicles (bikes, scooters, automobiles), parking spaces, and advanced information technology, allowing users to move from point to point on demand while cities reclaim urban land. Understanding how the required quantities of vehicles, parking spaces, and empty trips relate to each other and to the pattern of trips that must be served is essential not only because they determine the cost and performance bounds of existing MoD systems but also because they determine the potential of future autonomous MoD systems. Current transportation methods struggle to model these relationships: trip patterns are combinatorial and spatial, making comparative analysis cumbersome; modeling marginal changes requires solving computationally expensive routing problems; models require detailed data often unavailable; and findings from one system rarely generalize to others. I introduce a metric to quantify MoD system cost as infrastructure rent (vehicles and parking) and rebalancing work required to serve trip patterns and I present a modeling approach to macroscopically relate system requirements to trip patterns and land use characteristics by modeling accumulation dynamics through temporal activity decomposition. The approach allows predicting MoD performance by analyzing urban forms and activity mixing, and conversely, inferring spatial organization from observed dynamics. I demonstrate the framework through bike-sharing systems across multiple cities, revealing how spatiotemporal characteristics of trip patterns determine system performance and potential, and I discuss future directions and applications.

Earthquake safety: Safety-based urban design practices and digital tools toward resilient public spaces

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Short Bio: Donato Di Ludovico, PhD, Associate Professor in Urban Design and Landscape in the degree course in Construction-Architectural Engineering at the University of L'Aquila (Department of Civil, Construction-Architecture and Environmental Engineering - DICEAA). He carries out scientific research in the fields of new forms of spatial and strategic planning, urban and territorial safety, protection and regeneration, civil protection planning, knowledge systems and environmental assessment.

Abstract: The contribution describes the results of research on the general topic of pre-disaster/pre-event recovery planning, an emerging practice that pursues prevention objectives through multiscale spatial preparation, risk mitigation, and resilience building, to be implemented before disasters occur. It deals with how to keep urban government and essential services functioning, where to locate temporary housing, how and where to rebuild, how to reestablish essential economic activities, etc. Specifically, the research work concerns the optimization and design/planning of emergency waiting areas (public spaces organized in peacetime) to be used following a disaster, such as an earthquake, with the aim of minimizing risks during evacuation through preventive design choices based on safety. These choices influence urban layout and, consequently, the design of public spaces.

The research, conducted by the University of L'Aquila, is carried out using two integrated tools that are the result of highly interdisciplinary work: an analysis tool and an urban design tool, whose integration is one of the most innovative aspects. The analysis tool is simulation software, specifically designed and geared towards simulating the behavior of a crowd fleeing a natural disaster, in particular an earthquake, and part of an Urban Digital Twin (UDT). This simulation is based on the actual urban layout in which the crowd moves. The second tool uses the results of the analysis to define and apply safety-based urban design techniques to reduce risk during the evacuation phase. The research methodology can therefore be divided into two integrated macro-phases: i) the study and application of an integrated simulation model developed in a UDT, which includes the modeling of urban space, waiting areas, and crowd behavior; ii) the study and application of innovative urban design techniques capable of optimizing the urban form, and in particular open urban spaces, thereby increasing resilience and reducing the risk under analysis.

The contribution will present a practical application of the methodology to a historic center in central Italy.

Advanced geomatic techniques for infrastructure surveying and monitoring towards a sustainable and resilient environment

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Short Bio: Maria Alicandro is an Engineer and PhD, and an Associate Professor in the Department of Civil, Building, Architectural, and Environmental Engineering at the University of L'Aquila. She conducts research on the use of innovative Remote Sensing techniques (satellite, airborne, and UAV), GNSS, and GIS technologies, applied to the study, management, and monitoring of territories, structures, and infrastructures at the Geomatics Laboratory of DICEAA.

Abstract: Transitioning to sustainable, cooperative and automated mobility requires reliable digital infrastructure and high-precision positioning systems. In this context, this contribution integrates two complementary projects which, through advanced geomatic technologies, aim to support the enhanced management of transport infrastructures and vehicles.

The first project, HD SMART MAP, focuses on developing an integrated methodology for creating high-definition (HD) three-dimensional maps, with centimetre-level accuracy, aimed at improving mobility management and enhancing road safety. Using geomatics technologies, such as Mobile Mapping Systems (MMS), SLAM, LiDAR, terrestrial or UAV based, and GNSS systems, point clouds of the road environment are acquired and georeferenced. The data are processed using artificial intelligence algorithms to generate digital cartography that complies with international standards (OpenDRIVE, OpenSCENARIO). The aim is to create a detailed, interoperable and accessible digital twin that promotes driving automation, enhance road safety, and monitor the road conditions.

The second project, GNSSTRADE, focuses on optimising GNSS satellite positioning for smart mobility scenarios. In particular, it experiments with high-precision PPP-RTK solutions, evaluating real-time correction services (such as Point Perfect), combined with low-cost GNSS receivers and inertial units (IMUs) to ensure continuity and robustness even in complex urban environments. Several real-time kinematic experiments have been tested in real driving scenarios, urban and extra-urban contexts, to evaluate accuracy, reliability and costs of the combined system with real-time kinematic tests.

In summary, the adoption of autonomous vehicles and efficient management of road infrastructure will lead to reduced emissions and greater environmental sustainability. At the same time, The integration of the results or the projects will transform the transport system, making it smarter, more efficient and safer and they will support the development of smart infrastructure and the growth of the CCAM ecosystem.

PS3 - T3

PS4 - T3: Task 5.4 Workshop: Science and Scientific communication

From data to dialogue: connecting Science and Society

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Short Bio: With over 20 years of experience in library services, Alexandros Iliakis has been a permanent member of the Library and Information Center staff at the NTUA since 2005. He currently oversees Collections, electronic resources, bibliometrics, and open access initiatives.

Ingrid Colleau has a background in chemical engineering and worked in market research for seven years. Since 2022, she has been responsible for scientific communication across the eight technical institutions of IMT.

Abstract: This session serves as both a training and awareness-raising activity to explore Science Communication (SciComm) as a vital bridge between research and society. Its objective is to empower researchers, PhD students, and academic staff to communicate their work beyond disciplinary and institutional boundaries, engaging diverse audiences with clarity, creativity, and inclusiveness.

Effective Science Communication goes beyond the mere transmission of facts; it transforms complex or abstract research into accessible, relatable knowledge that supports evidence-based decision-making and counters misinformation. Importantly, SciComm is a two-way dialogue that requires understanding the audience, adapting tone and format, and fostering trust through relevance and storytelling.

The interactive session, lasting 60–90 minutes, combines short presentations, collaborative exercises, and hands-on practice. Through guided discussions, participants identify current science communication needs and barriers across EULiST partner universities, exploring their significance in policy, education, and public engagement.

Key activities include a one-minute elevator pitch exercise and creative practice sessions where participants reformulate the same scientific concept for different audiences—ranging from children and journalists to policymakers and industry representatives. These exercises cultivate essential skills such as simplifying without oversimplifying, employing metaphors and stories, and tailoring messages to varying levels of expertise and interest.

The session emphasizes accessibility and inclusiveness as central pillars of communication, promoting the use of plain, respectful language, multimodal content, and formats accessible to all audiences, including those with disabilities or limited technical access.

By the end of the workshop, participants will:
> Understand what SciComm is and why it matters.
> Acquire practical tools for clear, engaging, and inclusive communication.
> Reflect on applying these principles within their own research contexts.

PS4 - T3

PS3 - T4: The societal impact dimension of urban transformation: Ensuring sustainable and inclusive communities

Local energy initiatives for democratic future-making: Unpacking temporal ecologies, place knowledge, and Theories of Change

Johannes SUITNER
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Short Bio: Johannes Suitner is Assistant Professor of Urban & Regional Transformations at the Institute of Spatial Planning, TU Wien. He studies drivers and barriers of local sustainable transformations and what they imply for transformative governance. He is specifically interested in the influence of cultural and political factors on local transformations, social innovation, Theories of Change, and the transformation of urban and regional governance and planning.

Abstract: Local sustainability transformations are still by and large considered as processes of technological change. While techno-economic solutions in energy, mobility, construction and the likes are key to increasing system efficiency and transitioning to less resource-intensive urban systems, they have been widely criticized for blinding out the social, cultural, and political dimension of transformative change, leading to injustice or general backlash against sustainable development goals.

In my input, I will reflect on a study of local energy transition initiatives in Austria, showing how other factors beyond technological innovation, diffusion and embedding have informed these initiatives, namely: (1) framings and expectations of the past, present, and future, (2) knowledge of the specifics of place, and (3) imaginaries of systems and how they ought to be changed.

I will discuss what this implies for the ways in which we analyze and implement local transformations - in energy and beyond.

Renewable Energy Communities: economic and social analysis toward urban sustainable development

Prof. Massimo Gastaldi
University of L'Aquila, Italy

Short Bio: Massimo Gastaldi is now Full Professor in Managerial Engineering at University of L'Aquila. Current research issues: regulation and public utilities, green supply chain management, sustainability and circular economy, finance, and renewable energy. He is responsible manager of private and public research projects. He is author of more than 180 papers published on refereed books, journals and conference proceedings. Scopus indicators: Articles 158, Citations 4771, H-Index 40.

Abstract: This study presents a socioeconomic analysis of Renewable Energy Communities (RECs) in Italy, emphasizing their role in fostering sustainable development and social inclusion. The findings indicate that individuals expressing a willingness to participate in RECs tend to exhibit more environmentally conscious and socially responsible behaviors. RECs emerge not only as economic enablers for prosumers but also as mechanisms for enhancing collective well-being through community-oriented benefits. The analysis highlights a growing societal inclination to prioritize shared outcomes—such as investment in public infrastructure and support for economically vulnerable households—over individual financial returns. Three main insights emerge: (i) RECs are key instruments for advancing sustainable development; (ii) they serve as catalysts for strengthening collective well-being; and (iii) they act as economic drivers facilitating active citizen participation in the energy transition. The study concludes that the utilities sector must adapt to accommodate these evolving energy models. RECs thus represent a promising framework for an inclusive and equitable ecological transition, positioning sustainability, altruism, and community welfare at the core of future energy systems.

Sustainable schools: results and implications for urban climate change

Prof. Idiano D'Adamo
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Short Bio: Idiano D'Adamo is Full Professor of Management Engineering at La Sapienza University of Rome since December 2024. Within his career he has worked at the University of L'Aquila, University of Sheffield, CNR, Politecnico di Milano, and UnitelmaSapienza University of Rome.
Idiano is listed in the World Top 0.1% Scientists in 2024-2025 and in the World Top 2% Scientists from 2019 in the field of Energy and Environmental Science.

Abstract: Sustainable schools serve as fundamental communities where environmental awareness, social responsibility and technological innovation converge, preparing students to participate in broader sustainable urban systems. This study investigates the role of schools as catalysts for sustainability, examining how education and participatory approaches can promote knowledge and engagement in sustainable development. The research uses an online survey conducted in Italy that explores respondents' perceptions, priorities, and behaviours regarding sustainability in educational contexts. The results indicate a general concern for climate change and social issues, but reveal limited familiarity with the SDGs and a perception that schools do not fully address sustainability or social challenges. The findings highlight the importance of participatory education, the adoption of renewable energy, effective waste management and sustainability-focused training, emphasising the need for inclusive governance and the active involvement of school communities. Furthermore, the study suggests that sustainable schools can serve as centres of knowledge, promoting responsible decision-making and fostering a culture of collaboration and innovation that extends beyond the classroom to the wider urban context. These findings underscore the potential of schools to educate informed and responsible citizens, laying the groundwork for sustainable communities and advancing broader urban sustainability goals, particularly the development of resilient and inclusive cities.

Climate Crisis and Urban Inequality: A Mandate for Resilient Cities

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Short Bio: Johannes Lutter is a researcher and political consultant in urban development and heads the Executive Unit for International Relations at Vienna's climate & innovation agency, UIV Urban Innovation Vienna. Previously, he led UIV's urban development & mobility department. His work covers urban strategies, housing, tourism, participation, and local, metropolitan or cross-border governance, with a recent focus on sustainable and resilient urban development.

Abstract: The climate crisis affects us all — but not equally. Recent analyses show that the areas of Vienna most affected by urban heat island effects are also the most densely built, with high pressure on public space and a disproportionately large number of vulnerable residents — such as older people or those with low incomes — who often have limited means to protect themselves from the growing heat in the city.

In response, Vienna is taking targeted action through its new Urban Development Plan, the Vienna Heat Action Plan, and concrete local measures — from redesigning public spaces to establishing so-called cooling zones: publicly accessible shelters during heatwaves. These strategies and measures aim to foster a more resilient and inclusive city in the face of rapidly changing conditions.

Social life cycle assessment of mobility: A Finnish case study

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Short Bio: Anna Claudelin is a post-doctoral researcher in the Sustainability Change research group at LUT University. Her academic background includes environmental life cycle assessment and household carbon footprint analysis. In recent years, her research has included social life cycle assessment, which she has explored through two distinct research projects. Her work contributes to understanding the societal impacts of sustainability transitions.

Abstract: Various policies have been implemented to reduce greenhouse gas emissions from transportation, but their societal impacts may vary across different socioeconomic groups. This study conducted a social life cycle assessment (S-LCA) to evaluate the current mobility situation in a Finnish municipality. The stakeholder group considered was consumers—specifically, citizens—and the assessment focused on the use phase of transportation. A reference scale approach was applied, incorporating two qualitative indicators adapted from the literature and six quantitative indicators developed for this study. The assessment focused on affordability, accessibility, and satisfaction. Data were collected through a survey, and results were grouped by citizens' transportation mode, income level, and residential area. The results revealed unequal societal impacts. For instance, individuals in the lowest income group had the least access to home charging infrastructure, were most affected by rising fuel prices, and reported the lowest satisfaction with transportation costs and comfort. The study suggests that S-LCA can be used to evaluate policies, although the impacts cannot be fully isolated from other influencing factors.

PS3 - T4

A shared visions of Ukrainian cities

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Short Bio: Oleksandra Naryzhna is an architect-urbanist and founder of Urban Reform, a Ukrainian civic organization advancing sustainable urban development and participatory recovery. She taught at Ukrainian universities and at the Amsterdam Academy of Architecture, and launch director and led the Kharkiv School of Architecture from 2016 to 2021. Currently, she is launching the Urban Reform School to train a new generation of changemakers in urban planning.

Abstract: This session presents a practice-based reflection on how Ukrainian cities are redefining urban transformation — moving from reconstruction as a technical task to recovery as a collective social process. In a context of war and disruption, rebuilding cities means rebuilding communities, trust, and shared values.

Drawing on field experience from Urban Reform's work in several Ukrainian communities — including Okhtyrka, Shostka, Oleksandriia, and Irpin — the presentation explores how participatory urban research and co-design processes help articulate shared visions for the future. These visions act as new social contracts between citizens, municipalities, and experts, integrating ecological priorities, cultural identity, and economic resilience.

The session highlights methods of engagement that transform planning into a tool of social cohesion and democratic renewal: community dialogues, co-creation workshops, and spatial strategies developed collaboratively with residents. Such approaches turn post-war uncertainty into an opportunity for collective agency and inclusive governance.
A crucial part of this transformation is the emergence of new professionals capable of bridging technical expertise with societal understanding. As a response, Urban Reform has launched the Urban Reform School — an informal education platform that trains a new generation of planners, architects, and local leaders to act as agents of change. The School builds capacities for participatory planning, strategic thinking, and sustainable recovery, ensuring that shared visions can be implemented in practice.

Finally, the session reflects on how Ukraine's experience contributes to Europe's broader debate on sustainable and inclusive urban futures. It argues that in times of crisis, cities can become laboratories of resilience — where collaboration, empathy, and shared imagination become the foundation for transformative urban governance.

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