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Presented Posters

A Planning-Oriented and Regulatory Framework for the Systematization of Townscape Protection in Austria: Eastern Austria as a Study Region

DI Anna-Clarissa Dirnbacher (TUW)

Keywords:

townscape protection, Ortsbildschutz, spatial planning, cultural heritage, urban design, governance, planning law, heritage conservation, Austria

Abstract:

This study explores planning-oriented and regulatory approaches to townscape protection (Ortsbildschutz) in Austria, with Eastern Austria serving as the primary study region. It examines existing instruments, policies, governance structures, and the actors involved in shaping and implementing townscape protection across different administrative and spatial levels.

The research draws on selected case studies, planning frameworks, local development concepts, and regulatory instruments to evaluate both successful and less successful approaches to townscape protection in practice. By comparing planning strategies, implementation processes, and regulatory mechanisms, the study investigates which factors contribute to coherent and adaptable forms of Ortsbildschutz and which limitations commonly arise in planning practice.

Rather than understanding townscape protection solely as a restrictive regulatory instrument, the project explores its potential as an integrative planning approach that can balance preservation with contemporary development needs. Particular emphasis is placed on how modernization, architectural adaptation, and spatial transformation can be implemented in ways that remain compatible with the protection of existing townscapes.

Based on the analysis of planning instruments, concepts, governance structures, and practical examples, the research aims to contribute to the development of a practice-oriented guideline for the implementation of townscape protection within Austrian planning processes. The guideline seeks to demonstrate that adaptation and modernization do not necessarily stand in opposition to Ortsbildschutz, but can support the continued development and long-term preservation of local spatial identity when carefully integrated into their existing urban and cultural context.

Notes by the author:

Poster presentation based on an ongoing doctoral research project at TU Wien. The study focuses on the systematization of townscape protection (Ortsbildschutz) in Austria, with

Eastern Austria serving as the primary study region.

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- [5] Selected Austrian federal and provincial legislation, including Building Acts (Bauordnungen/Baugesetze), Spatial Planning Acts (Raumordnungsgesetze), Townscape Protection Acts (Ortsbildschutzgesetze), conservation law, and local planning and design guidelines.*

Optimizing Density in CrTiV-Based MPEAs through Light-Element Additions

Juraj Nálepka (STU), Pavol Priputen, Adrián Vavrínek, Michaela Halmanová, Simona Hornáčková

Abstract:

This research presents a systematic approach to lightweighting CrTiV-based multi-principal element alloys (MPEAs) by introducing light elements such as Al, Mg, and Ga. By substituting portions of the heavier Cr, Ti, and V atoms, alloys such as AlMgCrTiV and GaMgCrTiV achieve reduced theoretical density while maintaining structural integrity. The study highlights the influence of light-element addition on microstructure, phase stability, and mechanical performance, providing a pathway for designing low-density, high-performance MPEAs suitable for structural and functional applications. The poster discusses composition design strategies, theoretical density estimations, and preliminary microstructural observations, emphasizing the potential of light-element alloying to optimize the CrTiV MPEA family for advanced engineering applications.

Acknowledgment:

The authors acknowledge the financial support from the STU grant MV 1361.

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Microstructure and chemical characterization of multicomponent lead free solder Sn-Ag-Cu-Bi-Ni-Ga for battery electronics applications

Michaela Halmanová (STU), ČERNÍČKOVÁ Ivona, ŠULHÁNEK Patrik, HORNÁČKOVÁ Simona, NÁLEPKA Juraj

Abstract:

The replacement of Sn-Pb solders has promoted the development of lead-free Sn-Ag-Cu (SAC)-based alloys for electronic packaging. Although SAC solders offer suitable mechanical properties and interfacial bonding, their relatively high melting temperature, limited wettability, coarse microstructure, and excessive intermetallic compound (IMC) growth remain challenging. Therefore, minor alloying additions are used to improve microstructural stability and solder joint reliability.

The aim of this work was to investigate the microstructure and chemical characterization of a multicomponent Sn-Ag-Cu-Bi-Ni-Ga lead-free solder. Bi, Ni, and Ga were selected due to their influence on the Sn-rich matrix, eutectic morphology, and interfacial IMC formation. The microstructure was examined by scanning electron microscopy (SEM), while the local chemical composition and elemental partitioning were analyzed using energy-dispersive X-ray spectroscopy (EDX). Bi can strengthen the Sn matrix, refine β -Sn grains and Ag_3Sn phases, and suppress Cu_6Sn_5 and Cu_3Sn growth, although excessive Bi may form brittle Bi-rich phases. Ni promotes the formation of stable $(\text{Cu,Ni})_6\text{Sn}_5$, refines the microstructure, and improves interfacial stability during thermal exposure. Ga may slightly decrease the melting temperature and reduce IMC layer thickness, while its effect on wettability and shear strength depends on concentration.

The combined addition of Bi, Ni, and Ga represents a promising approach for tailoring the microstructure and interfacial reactions of SAC-based solders. This study provides insight into phase distribution, IMC formation, and elemental partitioning in the Sn-Ag-Cu-Bi-Ni-Ga system, contributing to the design of reliable multicomponent lead-free solders.

Acknowledgment:

Funded by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project No. 09I04-03-V02-00046.

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Component-Level Circularity: A Digital-Physical Approach to Smarter End-of-Life Recovery

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Keywords:

Circular Economy, Reliability Engineering, Distributed Ledger Technology

Abstract:

What happens to the individual components inside a product when that product reaches end-of-life? Today, the answer is simple, and wasteful: everything goes to recycling, regardless of condition. Components with years of useful life remaining are destroyed alongside those that are genuinely exhausted. With EU regulations such as the Digital Product Passport, Battery Regulation, and Right-to-Repair Directive now demanding verifiable lifecycle data, this practice is no longer just unsustainable, it is increasingly non-compliant. This research proposes a decision-support framework that assesses individual components at end-of-life, links their condition to the most appropriate circular recovery pathway, and supports data trustworthiness through distributed ledger technology. Demonstrated on a professional battery chainsaw, the results show that approximately 80% of components retained reusable life, value entirely lost under product-level disposal, and that 70% of the circular decision is achievable with visual inspection alone. The work bridges circular economy, reliability engineering, and digital trust to turn end-of-life from a single decision into a component-by-component opportunity.

Acknowledgment:

This research is funded by the European Union under their competitive HORIZON-MSCA-2021-DN-01 (Marie Skłodowska-Curie Doctoral Networks) programme under Grant Agreement No. 101073508.

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Pricing European Options : Black-Scholes vs Monte Carlo

Ian Spika (STU)

Keywords:

European options, Black-Scholes model, Monte Carlo simulation, option pricing, implied volatility, R

Abstract:

This project compares two approaches to pricing European call options: the analytical Black-Scholes formula and numerical Monte Carlo simulation. The theoretical part introduces the risk-neutral valuation framework, geometric Brownian motion, and the closed-form Black-Scholes price for a vanilla European call option. The computational part implements both methods in R and validates the Monte Carlo estimator by studying its convergence to the analytical benchmark. The results confirm the expected convergence rate of order $O(1/\sqrt{n})$ and show how confidence intervals shrink as the number of simulated paths increases.

Notes by the author:

Project repository and materials are available online.

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Validation of the Italian version of the Genetics and Genomics in Nursing Practice Survey (GGNPS)

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Abstract:

Background and Purpose: Genomic literacy is essential for nurses to integrate genomics into clinical practice. The Genetics and Genomics in Nursing Practice Survey (GGNPS) is a multidimensional tool designed to assess attitudes, practices, receptivity, confidence, and competencies in this field. The primary objective of this study is to culturally adapt the GGNPS to the Italian context and provide preliminary psychometric evidence among nursing students. A secondary objective is to evaluate the associations between genomic knowledge levels and participants' socio-demographic characteristics.

Methods: A cross-sectional observational study was conducted in March 2024 with 315 undergraduate nursing students enrolled at the University of L'Aquila, following STROBE guidelines. The tool was translated and culturally adapted following Guillemin's guidelines. Data were collected via an online survey. Internal consistency and reliability of the 12-item genomic knowledge section were evaluated using the Kuder-Richardson (KR-20) formula. Item difficulty, item-total correlations, and socio-demographic associations (Student's t-test, ANOVA, and Pearson correlation) were also analysed ($p < 0.05$).

Results: The sample (mean age 25.6 ± 7.2 years; 73.0% female) achieved a mean genomic knowledge score of 9.28 out of 12. Marked variability in item difficulty and a ceiling effect (> 96% correct answers) were observed for clinically oriented items (e.g., breast cancer, diabetes), while critical deficits emerged in basic genetic principles (e.g., role of a single gene variation, 28.3%). Higher knowledge scores were significantly associated with female gender ($p = 0.001$) and superior high school graduation grades ($p = 0.021$). Only 2.2% performed clinical placements in Medical Genetics Units. The knowledge section demonstrated a modest internal reliability (KR-20 = 0.471), reflecting the instrument's highly multidimensional structure and the heterogeneous difficulty of its items.

Conclusion: The Italian version of the GGNPS provided preliminary evidence of feasibility and conceptual relevance for assessing genomic dimensions among nursing students. However, the modest internal reliability of the knowledge section suggests the need for further psychometric evaluations. Furthermore, the stagnation of knowledge scores across the academic years ($p = 0.825$) and the lack of clinical exposure highlight a critical

theory-practice gap. Nursing education must transition toward a longitudinal spiral curriculum, actively integrating genomic learning objectives directly into clinical practice rather than isolated theoretical modules.

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Innovating For Regenerative Futures

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Keywords:

Regeneration, Regenerative Business, Technology Entrepreneurship

Abstract:

Sustainability alone is no longer sufficient to respond to the scale of today's ecological and social crises, as recent evidence shows that several planetary boundaries have already been exceeded (Planetary Health Check, 2025). While conventional sustainability approaches often focus on reducing harm, regeneration aims to create net-positive impact by restoring, renewing, and enhancing social-ecological systems. My poster explores how technology ventures can embed regenerative practices into their business models and scale them over time, addressing current gaps in how such practices are operationalized, sustained, and supported across venture and ecosystem contexts (Das & Bocken, 2024). It highlights the need for clearer concepts, stronger empirical evidence, and supportive ecosystems that enable ventures to contribute towards a regenerative future.

Acknowledgment:

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Inverse design for integrated photonics

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Keywords:

integrated photonics, inverse design, topology optimization, silicon photonics, polymer photonics

Abstract:

Photonic chips are the internet's backbone and key to future quantum computers. They use light instead of electricity to process information. Traditionally, they are designed from experience and intuition, then fine-tuned for the target application. However, modern and specialized devices are challenging to create by this method. Hence, we can flip the problem, using inverse design. Starting from a desired functionality, an optimization algorithm obtains the design automatically from a block of material. In terms of fabrication, current chips are flat, with limited design freedom. Building on our earlier 2D work, we collaborated with Laser Zentrum Hannover to design and fabricate 3D nanoscale devices using laser-based 3D printing. The 3D devices outperform their flat counterparts, a step toward smaller, cheaper, and rapidly produced photonic chips.

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Lightening the Arm: A Remotely Actuated Elbow Exoskeleton for Safe Rehabilitation

Douma Rossanna - Theodora (NTUA)

Keywords:

Elbow Exoskeleton, Remote Actuation, Bowden Cable Transmission, Series Elasticity,, Human-Robot Interaction

Abstract:

Conventional elbow exoskeletons often place motors and transmission components directly on the user's arm, increasing inertia, discomfort, and safety concerns during rehabilitation. This project presents the design and development of a remotely actuated elbow exoskeleton that relocates the power unit to a backpack-mounted module and transmits torque through a Bowden cable system, significantly reducing distal mass. The device was designed around human arm biomechanics and incorporates adjustable anthropometric features, a wide functional range of motion, and multiple protection mechanisms, including mechanical motion limits and emergency disengagement strategies. The proposed architecture establishes a lightweight and scalable platform for future rehabilitation and assistive robotics applications, with the potential for EMG-based intention-driven control.

Machine Learning and Deep Learning Approaches for Informal Economy Estimation and Detection

Vladimir Giustacchini (JU), Andrej Kútňy

Keywords:

informal economy, shadow economy, machine learning, deep learning

Abstract:

This study focuses on analyzing the types of Machine Learning and Deep Learning methods that have been employed in applications designed to address issues related to the informal economy, as well as the way these methods have been applied. It also examines the main challenges associated with these techniques and discusses possible ways to overcome them. Answering these questions is essential for gaining a better understanding of activities within the informal economy. These methods can help identify potential cases of undeclared or underdeclared work, while also supporting the estimation of the size, location, and origin of economic activities that are currently unobserved by the authorities. Increasing the transparency of these activities could benefit both supporters and critics of the informal economy by providing more reliable information for analysis and decision-making. To investigate this topic, a large number of papers published between 2016 and 2026 were analyzed. Following the PRISMA framework, each paper was included or excluded based on several criteria, including its title and abstract, number of citations, and the journal, conference, or book in which it was published. A quality score was then assigned according to the overall relevance and quality of each paper. The results suggest that both Machine Learning and Deep Learning techniques can be effective, depending on the type of variable that needs to be predicted. The review also identified several limitations and challenges, including the difficulty of obtaining high-quality data in an ethical manner, integrating spatial information to improve prediction accuracy, and establishing benchmark datasets for future research. This study aims to provide a clearer direction for estimating and detecting activities related to the informal economy.

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Towards an Integrated Framework for the Management and Evaluation of Megaprojects across their Spatial Life Cycle: The Megaproject Performance Index (MPI)

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Keywords:

Megaprojects Management; Megaproject Performance Index (MPI); Megaproject Paradox Theory; Spatial Planning; Machine Learning

Abstract:

Megaprojects systematically underdeliver due to governance inefficiencies, cost overruns, and a lack of integrated sustainability frameworks. This paper proposes the Megaproject Performance Index (MPI), a composite multidimensional index synthesising eight sustainability pillars — environmental, social, economic, governance, resilience, risk, transport, and long-term legacy — across 57 indicators and four lifecycle phases. The framework integrates AHP for weight elicitation, System Dynamics for causal feedback modelling, Monte Carlo simulation for uncertainty quantification, and Random Forest for predictive analytics, all embedded within a GIS-based decision-support architecture. A proof-of-concept application to a hypothetical urban metro extension yields MPI = 64.58 against a construction-phase benchmark of 65.0, demonstrating the index's discriminative capacity.

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Designing for Material Experiences: Integrating Soft and Hard Goods in Industrial Design

Mercedes Barral Cabrera (JU)

Keywords:

Material Experience, Material System, Integration of soft goods and hard goods, Infant Car Seat Design, Outdoor

Abstract:

Materials are traditionally selected because of their technical properties, individually and separate from industrial design development processes. This approach often overlooks material perception, the collective appeal of materials, and important industrial design considerations.

This study explores how to design meaningful material experiences through a thoughtful and effective integration of soft goods and hard goods. Developed through the design development of an infant car seat, the study combines CMF and industrial design within the same process.

Preliminary research identified four key guidelines for this integration: designing the product as a whole, fostering early cross-team communication, managing colors and finishes, and evaluating materials together within their context. These findings were introduced into an Integrated Design and Material Methodology, together with the Double Diamond design process and Material Driven Design processes.

Through material exploration, concept development, and digital visualization, this study demonstrates how integrating soft goods, hard goods, and industrial design from the early stages of the process can create more coherent, expressive, and experientially rich products.

Acknowledgment:

Thule and Jönköping University

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Greenhushing in the Spectrum of Sustainability Communication

Anna Maria Gavrilov (JU), Vlada Orlova, Andrea Ramírez Benedi

Keywords:

Greenhushing, Greenwashing, Transparent Sustainability Communication, Generation Z, Signaling Theory, Fashion Industry

Abstract:

The poster presents the findings of a qualitative study examining how Generation Z consumers (aged 18–25) perceive and respond to greenhushing, which is the deliberate under-communication of sustainability efforts, in the fashion industry. Through six focus groups with 45 participants exposed to three fictional Instagram accounts representing greenwashing, transparent sustainability communication, and greenhushing, we found that silence paradoxically generated the highest levels of trust and strongest purchase intentions. While greenwashing consistently eroded credibility and transparent sustainability communication polarized participants, greenhushing was interpreted as authenticity rather than concealment. Drawing on signaling theory, we introduce the concept of the 'meta-signal', where the absence of a claim itself communicates genuine commitment. These findings carry important implications for how fashion brands navigate sustainability communication in an increasingly skeptical consumer landscape.

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Design of Filamented HTS Tapes with Preservation of Optimal Critical Current

Simona Hornáčková (STU) ORCID: 0000-0002-1690-7526, Dominik Martoš, Lubomír Frolek, Ján Šouc, Marcela Pekarčíková, Michaela Halmanová, Juraj Nálepka

Keywords:

High-temperature superconductors, AC losses, filamentation, photolithography

Abstract:

High-temperature superconductors (HTS) of the REBCO type represent a promising material for applications operating in alternating magnetic fields, where alternating current (AC) losses occur. One of the effective methods for reducing these losses is the filamentation of the superconducting layer, in which the tape is divided into narrow superconducting segments (filaments). However, this approach leads to a reduction of the critical current due to the decrease in the effective superconducting cross-sectional area. The aim of this work was to analyze the influence of the number of filaments on the critical current and AC losses in 2 mm wide REBCO tapes with a silver stabilizing layer prepared by photolithography. Within the experimental study, critical current measurements, AC loss measurements, and microscopic analysis of the structure of the filamented tapes were performed. The results confirmed a gradual decrease in the critical current with increasing number of filaments, accompanied by a significant reduction of AC losses. An optimal compromise between AC loss reduction and preservation of the transport properties of the tape was identified in the range of approximately 3–5 filaments.

Acknowledgment:

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Asking Better Questions: LLM-Based Clarifying Question Generation for Conversational Recommender Systems

Anna Baghumyan (TUW)

Keywords:

Conversational Recommender Systems, LLMs, Preference Elicitation

Abstract:

This work investigates the generation and evaluation of large language model (LLM)-based clarifying questions for conversational recommender systems. Specifically, it examines two questioning strategies—attribute-based and usage-based—and evaluates their generation under different prompting configurations, including zero-shot and few-shot prompting. Using real-world e-commerce data, the study assesses the quality of the generated questions in terms of their ability to elicit meaningful user preferences in session-based conversational recommendation scenarios. The objectives are to compare question quality across prompting strategies and question types, and to identify a robust set of high-quality clarifying questions for use in a subsequent user study.

Introduction to Digital Humanism

Julian Schlör (TUW) ORCID: 0009-0004-0753-5750

Keywords:

Digital Humanism, Digital Ethics, Vienna Manifesto on Digital Humanism

Abstract:

In recent years, the invention and increasing availability of digital devices, such as computers and mobile phones, have paved the way to a new, rapidly evolving space: the realm of digital technologies.

Starting with digital spreadsheets and office software, we now use digital technologies to navigate, communicate, watch entertainment, and much more. AI agents answer calls automatically, and self-driving cars operate in cities like San Francisco.

At the same time, digital technologies revealed their non-glamorous side: large-scale surveillance, extensive data collection, AI systems exhibiting bias leading to discriminatory outcomes, and social media posing a danger to mental health and democracy, due to increasing disinformation and echo chambers.

In response, policymakers have introduced regulations, such as the GDPR and the AI Act of the European Union. In science, research, and innovation, broader frameworks for addressing the societal influences of digital technologies were sought.

One such interdisciplinary framework is Digital Humanism, which places human rights, democratic values, and societal well-being at the center of technological development. Critically examining the relationship between digital technologies and society, Digital Humanism aims to ensure that innovation serves humanity while respecting fundamental human rights and values.

Salero

Lucía Moreno Caro (URJC), Pablo Padilla Bermejo, Noelia González Lancho, Gemma de Mingo Palacios, María Pérez García, Adrián Villacañas-Sánchez

Keywords:

community building, graphic design, social interaction, urban isolation, micro-bubbles, placemaking, village dynamics

Abstract:

Salero is a community project exploring how graphic design can spark social interaction within micro-bubbles, actively combating unwanted isolation and discrimination.

Often, we disconnect from what truly matters, our passions stifled by urban demands and the daily grind. We propose a platform that reclaims space for leisure, genuine connection, and community-building (mirroring traditional village dynamics). Because when we actually know our neighbors, there is always someone you can ask for salt.

Notes by the author:

Open-source graphics resources are available at:

https://drive.google.com/drive/folders/1wRinCE7pG6NM2n2_F0ZMP2q5IUiszXKR?fbclid=PAZXh0bgNhZW0CMTEAc3JOYwZhchBfaWQPOTM2NjE5NzQzMzkyNDU5AAGnfG6MsfGup5sjKrRK0tINujpv-_RuCJFBct5PSRr73hJOJ3pQ4pHy52yWQxU_aem_3qNvSYCZs07TI9M1deRh2w

CalmaPulse: On-demand anxiety relief, at your wrist

Filoxeni-Kyriaki Laskaridou (NTUA), Eugenia Skouloudi and Lamprini Kourou

Abstract:

CalmaPulse is an early-stage startup that aims to develop a wearable device for the relief of anxiety and panic attack symptoms through median nerve stimulation. With over 365 million people currently suffering from anxiety and one in three individuals projected to experience an anxiety disorder in their lifetime, the personal and economic toll is profound. Current wearables only track stress levels, while existing interventions often rely on costly, non-immediate solutions or addictive medications, leaving a significant gap for effective, on-demand support that goes beyond mere wellbeing. To bridge this gap, CalmaPulse is building a discreet, non-invasive device for immediate intervention when it is needed most.

Mixed Reality for Firefighting: Explainable AI for In-Situ Hazard Assessment

Elias Panner (TUW) ^{ORCID: 0009-0009-5172-386X}, Sara Scheffer, Kurt Matyas

Keywords:

Mixed Reality, Explainable Artificial Intelligence, Firefighter Training, Hazard Detection, Human-AI Interaction, Safety-Critical Systems

Abstract:

Firefighters operate in environments characterized by low visibility, high cognitive load, and severe time pressure, where situational awareness and rapid hazard assessment are critical. This project investigates how AI-based hazard detection and explainable artificial intelligence can be integrated into mixed reality to provide spatially grounded, interpretable, and trustworthy guidance for fire-safety assessment and firefighter training. The developed prototype combines a YOLO-based hazard detection backend with local visual explanations generated through Eigen-CAM and Grad-CAM++, and presents detections and explanations through a Meta Quest 3 mixed-reality interface. A formative evaluation with researchers and firefighters compared unaided inspection with XAI-supported MR guidance across controlled and real-object settings. The findings show that the MR-XAI prototype made model reasoning inspectable and helped users better understand and calibrate trust in correct detections. However, the system did not improve task efficiency, mainly due to interaction overhead, detection reliability issues, and temporal instability. The project contributes a working MR-XAI prototype, formative evaluation insights, and design principles for explainable AI support in safety-critical mixed-reality applications.

The importance of soft skills in software companies: An analysis of job advertisements

Eduard Ailincăi (LUT)

Abstract:

In today's software industry job market, candidates often focus primarily on technical competencies, overlooking the critical role of soft skills in achieving professional success. However, employers increasingly demand interpersonal abilities, such as communication, teamwork, and problem-solving, indicating that technical skills alone are no longer sufficient to secure employment. This study examines the demand for soft skills by analysing job advertisements and identifying the interpersonal competencies specified within them. The aim is to provide a clearer understanding of the importance and popularity of soft skills across common roles in the software industry.

A total of 340 job advertisements were collected and analysed, including 149 from the Finnish market and 191 from the Romanian market. The study compares the soft skill requirements for software engineers, software developers, software architects, and data scientists, as well as showcasing differences between the two countries. The results reveal significant variations across roles. Key findings of the study show that only 67% of job postings for software developers explicitly require at least one soft skill, compared to 94% for data scientists. Software architects have a ratio of 4.77 soft skills on average per post, while the software developer role averages 3.7 soft skills per post. When comparing the two countries' markets, the Data Scientist role shows notable differences in the aptitudes expected by recruiters, whereas the soft skill requirements for Software Engineers are much more similar. With an even higher discrepancy, for the software developer role, leadership skills have 20 appearances out of 64 job ads analysed in the Romanian market, but 0 out of 47 on the Finnish side.

Implementation of the social pillar of ESG through corporate housing and its impact on the company's economic stability

Jakub Vargan (STU)

Keywords:

Company housing, ESG, Social pillar, Employee retention, ESRS, Turnover, Investment model

Abstract:

This research presents a financial model evaluating corporate rental housing as a practical instrument for implementing the ESG social pillar in Slovak industrial enterprises. Based on real market conditions in the Bratislava Region (Q1 2026), the model quantifies the combined impact of direct rental income and indirect savings generated through improved employee retention and workforce stability. The results demonstrate that incorporating social benefits into investment evaluation increases total ROI from 5.86% to 8.50% and improves the DSCR from 1.21 to 1.75. Monte Carlo simulation confirms the robustness of the investment, indicating a 95% probability of exceeding the WACC threshold. Sensitivity analysis identifies the key factors affecting project viability. The findings suggest that corporate housing investments can simultaneously support ESG objectives, strengthen human resource management, and contribute to compliance with ESRS S1 reporting requirements.

TEDx IMT in partnership with EULIST

Théo Pereira De Araujo (IMT)

Keywords:

Academic innovation, European University

Abstract:

TEDXIMT (EULIST Edition) is an ambitious, student-led conference scheduled for February 2027 in Paris at the iconic Folies Bergère. Driven by a dedicated team of 20 students from across the Institut Mines-Télécom ecosystem, this project aims to create a premier platform for intellectual exchange within the EULIST alliance. Our poster outlines the vision, the multidisciplinary approach, and the logistical framework of building a large-scale event. We highlight how this initiative fosters student leadership, bridges European communities, and promotes a shared culture of innovation.

Presented Pitches

Antibiotic Resistance: The Invisible Threat Around Us

Maria Kalli (NTUA) ORCID: 0000-0003-0701-239X

Keywords:

Antibiotic-resistant bacteria, Antibiotic-resistance genes, Antibiotic resistance, Wastewater treatment plants, Disinfection

Abstract:

Antibiotic resistance is becoming an increasing threat to human health, spreading far beyond hospitals and clinics. Antibiotic-resistant bacteria (ARB) and antibiotic resistance genes (ARGs) are now found in wastewater, surface water, drinking water and soil, enabling the transfer of antibiotic resistance via the environment and back to humans. Natural water resources are increasingly threatened by climate change, population growth, urbanization, and industrialization. To reduce the strain on freshwater supplies, treated wastewater can be used for various purposes, including irrigation and industrial applications. However, conventional wastewater treatment plants (WWTPs) are not designed to effectively eliminate ARB and ARGs originating from anthropogenic sources. There is significant potential for these ARGs to spread within soil ecosystems through horizontal gene transfer (HGT) among microorganisms and vertical gene transfer (VGT) across generations, thereby substantially contributing to the propagation of antibiotic resistance. Conventional WWTP disinfection effectively reduces ARB, with UV irradiation (70 mJ/cm²) achieving 2.4-2.7 log removal and chlorination (50 mg Cl₂·min/L) achieving 3.7-4.3 log removal. However, ARGs remain largely persistent, with only 1-2.5 log reduction observed even under high chlorination exposure (220 mg Cl₂·min/L). These results highlight the need for integrated treatment strategies, including advanced oxidation processes, to enhance the removal of ARB and ARGs.

Beyond Planetary Boundaries: The Need for Societal Upper Limits

Ellaroosa Rokka (LUT) ORCID: 0009-0003-8894-6772

Keywords:

societal change; planetary boundaries; social sustainability; system interdependency; collective self-limitation

Abstract:

Humans are an inseparable part of nature. Planetary well-being reveals humanity's dependence on thriving ecosystems, yet we are increasingly endangering both ourselves and the planet. Overconsumptive and socially unsustainable structures are driving intertwined ecological and societal crises. However, these crises are often examined separately, obscuring their interdependence. This presentation builds on an article manuscript that addresses this gap by proposing a contextual framework that integrates societal boundaries with downscaled absolute environmental sustainability assessment. It explores how societal boundaries can complement biophysical planetary limits by introducing collectively and contextually negotiated upper limits that address overconsumption, well-being, and justice issues. The presentation asks how societal boundaries can be conceptualised and how related ideas, such as social foundation, sufficiency, and consumption corridors, connect to this concept. Drawing on a review of interdisciplinary sustainability research, it aims to clarify the concept of societal boundaries and discusses the role of upper limits in supporting societal change towards more sustainable ways of living. By supporting the conceptualisation of societal boundaries, this presentation contributes to ongoing debates on how upper limits to human activity can support sustainability transformation. It is particularly relevant to researchers, practitioners, and students interested in sustainability, justice, and societal transformation.

Bioacoustics for bat conservation: when acoustic monitoring is (not) enough

Andrea Valeri (UNIVAQ) ^{ORCID: 0009-0000-5006-7412}, Corrado Modica, Enrico Lunghi

Keywords:

Chiroptera, monitoring, cave, echolocation

Abstract:

Bioacoustic monitoring is a widely used tool for bat research and conservation. As one of the most elusive groups of mammals, bats can be effectively surveyed through the use of ultrasonic detectors and specialized analysis software, often combined with support tools like online libraries and species classifiers. These technologies enable researchers to assess bat communities and collect valuable data for conservation planning while minimizing disturbance to wildlife. Although acoustic monitoring offers significant advantages, it also has limitations. In some cases, acoustic data alone may not be sufficient for accurate species identification, highlighting the need for direct field validation and, for cryptic species, the integration of molecular analyses.

Acknowledgment:

All authors want to thank University of L'Aquila and EULiST for giving us the opportunity to present our work at the student conference.

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COMET-NANO: Nanoparticles à la Carte. Cooking Up Tailor-Made Nanostructures from Metal Complexes

Elsa de la Osa del Cerro (URJC)

Keywords:

Nanotechnology, Nanomaterials, Nanoparticles, Metal Complexes, Organometallic Chemistry, Biomedical Applications, Environmental Remediation, Photocatalysis, Sustainability, Advanced Materials.

Abstract:

Nanotechnology has emerged as a key scientific field due to the unique properties that materials exhibit at the nanoscale. COMET-NANO, a research group at Universidad Rey Juan Carlos, focuses on the design, synthesis and characterization of advanced nanostructured materials and metal-based systems for applications in biomedicine, environmental remediation, energy and sustainability. The group's research is based on the use of molecular metal complexes as precursors for the controlled synthesis of functional nanomaterials, enabling precise tuning of their composition, morphology and properties.

Current research activities include the development of therapeutic nanoplateforms for cancer and neurodegenerative diseases, antimicrobial materials for infected wounds, photocatalytic systems for pollutant degradation, technologies for CO₂ and N₂ valorization, hydrogen production, and novel memristive devices for neuromorphic computing. Representative projects such as ROS-FUN, VOLUPIA, TANATOS, DesvELA, BrainMIND and METALOHEAL illustrate the broad interdisciplinary nature of the group's work. This presentation provides an overview of COMET-NANO's research strategy and highlights the potential of nanostructured materials to address major challenges in healthcare, environmental protection and advanced technologies.

Notes by the author:

This presentation aims to introduce the main research lines of COMET-NANO and demonstrate how molecular design can be used to create functional nanomaterials for diverse applications. Particular emphasis will be placed on the relationship between precursor design, nanoparticle properties and final performance in biomedical, environmental and technological applications. The presentation is intended for a multidisciplinary audience and does not require specialized knowledge in nanochemistry.

Acknowledgment:

I would like to express my sincere gratitude to Prof. Santiago Gómez-Ruiz and the COMET-NANO Research Group at Universidad Rey Juan Carlos for their valuable feedback, guidance, and for providing supporting materials and images that contributed to the preparation of this presentation.

References:

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Enhancing CO₂ Solubility for Improved Geological Storage Performance

Antonios Georgios Tsiftsidis (NTUA)

Abstract:

This project examines how enhancing CO₂ solubility in water can improve the safety and efficiency of geological CO₂ storage. Conventional supercritical CO₂ injection may cause plume migration, pressure buildup, and leakage risk. For this reason, the Ex-Situ Dissolution Approach (ESDA) is evaluated as an alternative method, where CO₂ is dissolved in brine before injection.

Using a compositional TNavigator reservoir model, different CO₂ injection scenarios are compared in terms of reservoir pressure, plume behavior, CO₂ distribution, and trapping mechanisms. The results show that dissolution-based injection reduces mobile CO₂, limits plume migration, and increases solubility trapping, leading to safer and more stable long-term storage.

Measurement of muon's $g-2$ at Fermilab: Searching for New Physics

Theodoros Perimenis (NTUA)

Keywords:

Muon, Anomalous Magnetic Moment ($g-2$), Fundamental Physics, Fermilab, Accelerators, Detectors

Abstract:

This work provides a comprehensive review of the Muon $g-2$ experiment (E989) at Fermilab, focusing on both its theoretical significance and the cutting-edge technology that enables its high-precision measurements. The anomalous magnetic moment of the muon, serves as a critical probe for exploring physics beyond the Standard Model (BSM).

The core of this study delves into the advanced accelerator and detector complexes at Fermilab's Muon Campus. Specifically, we analyze the production of the muon beam and the technical challenges of the superconducting storage ring, emphasizing how magnetic field uniformity is achieved and monitored via NMR technology. Furthermore, the instrumentation framework is examined, including the Cherenkov crystal calorimeters, laser calibration systems, and tracking detectors.

Finally, the latest experimental results are evaluated against current Standard Model predictions, highlighting the persistent theoretical tension and its implications for new physics. Ultimately, this project underscores the technological legacy of E989, which sets new standards for next-generation precision experiments like J-PARC.

Notes by the author:

This project was conducted within the framework of the course "Detector and Accelerator Technology"

Acknowledgment:

Special thanks to professor, Mr.Kopsalis Ioannis, for providing me with the opportunity to undertake this project and allowing me to explore the latest experimental developments in fundamental physics.

The Role of Clarifying Questions in Conversational Recommender Systems: Balancing Explicitness

Anna Baghumyan (TUW)

Keywords:

Conversational Recommender Systems, Large Language Models, Preference Elicitation, Question Generation

Abstract:

As online platforms increasingly rely on personalized recommendations to support user decision-making, effectively understanding user preferences remains a key challenge. Conversational recommender systems address this challenge through natural language dialogue, but their success depends heavily on how they elicit user preferences. This research investigates how different types of clarifying questions—attribute-based and usage-based—affect recommendation quality and user experience. It first explores the use of Large Language Models to automatically generate these questions from German e-commerce data and evaluates their quality under different prompting strategies. Building on these results, a user study examines how the two questioning approaches influence user satisfaction and perceived recommendation relevance. The findings aim to advance the design of more adaptive, user-centric conversational recommender systems.

The Video Gap: How European B2B Companies Are Losing Business in Silence

Amos Okoya Godgift (IMT)

Keywords:

B2B marketing, video production, AI-assisted content, digital transformation, European SMEs

Abstract:

Video is a highly effective tool for building trust in modern marketing. However, European B2B companies, especially SMEs, rarely use it. Client testimonials, founder stories, or product demos are almost nowhere to be found. Globally, 87% of top-performing B2B marketers rely on video, yet only 51% of European SMEs have adopted digital marketing. In France, 48% of companies feel digitally unprepared, compared with just 6% in Germany. This poster examines the reasons for this gap, its impact on revenue and trust, and how a streamlined, AI-assisted production model developed from years of video production experience can address these challenges without requiring large budgets or lengthy timelines.

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