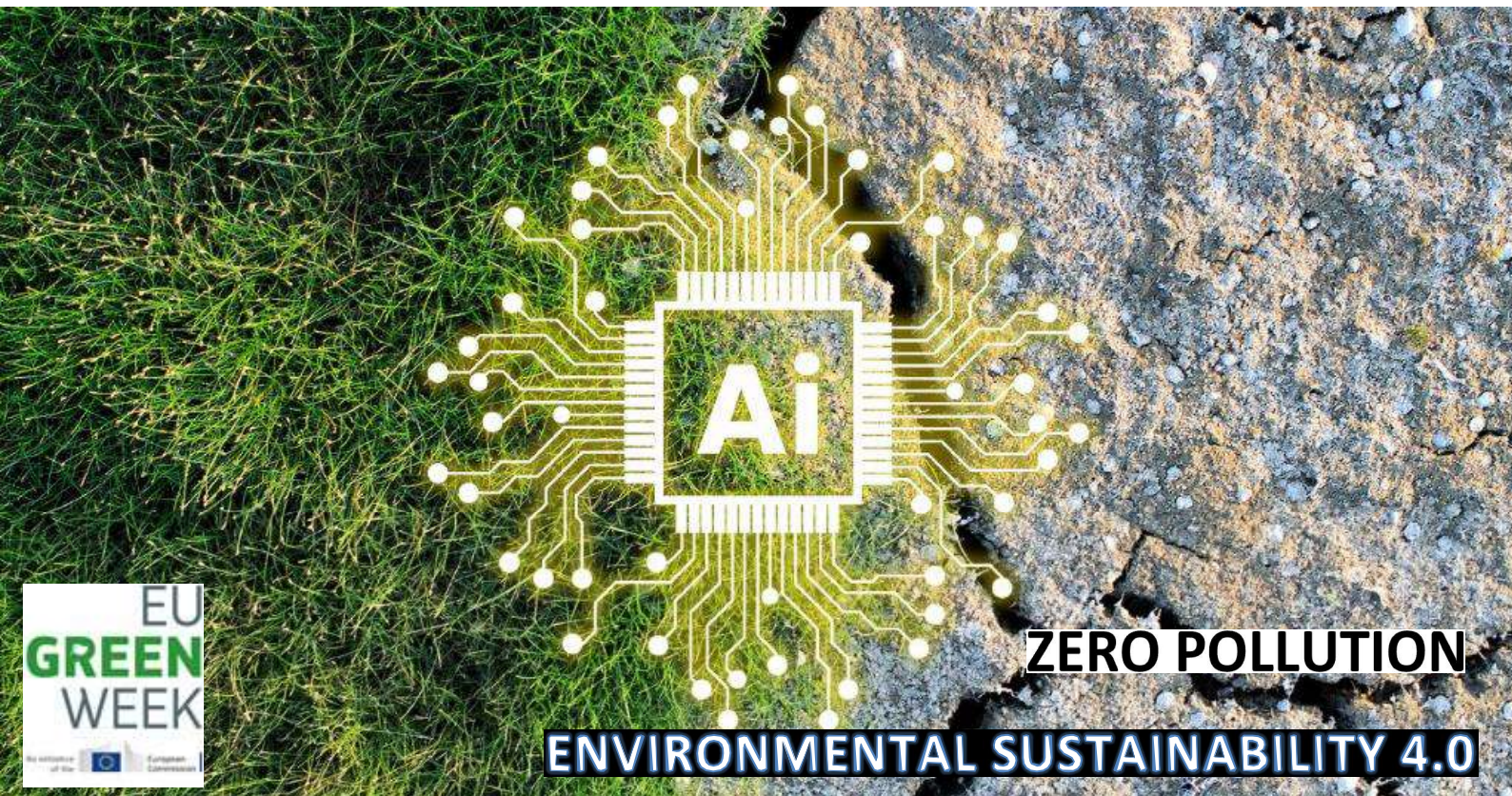


# BOOK OF ABSTRACTS



# 5<sup>th</sup> International Workshop

TOWARDS ZERO POLLUTION

2025    Viseu  
29 May

May, 2025

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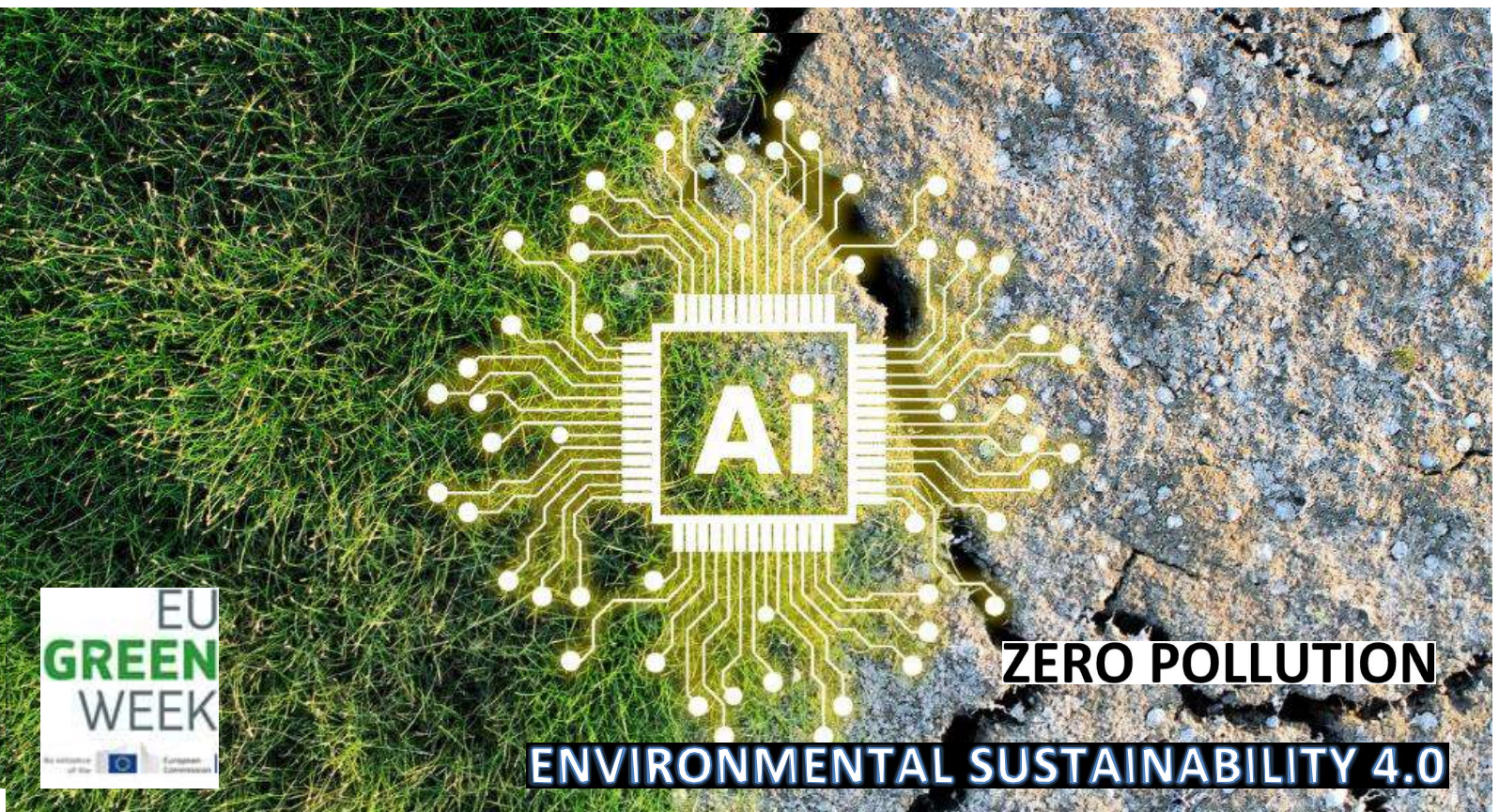
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# BOOK OF ABSTRACTS



The European Green Week is an annual event organised by the European Commission to address environmental issues and promote sustainable initiatives. In 2025, the event is themed "*Circular Solutions for a Competitive EU*", highlighting the European Union's commitment to integrating digital technologies with ecological practices, aiming for a green, efficient, and innovative transition.

It brings together researchers, students, teachers, and institutional partners around a common goal: building scientific and technological solutions that move us closer to a zero-pollution future. This approach combines sustainability with digital transformation through the application of artificial intelligence, the Internet of Things (IoT), and data analysis in environmental monitoring, smart resource management, and emission reduction. The adoption of these technologies enables process optimisation, strengthens the circular economy, and enhances energy efficiency across various sectors. Sustainability 4.0 also promotes climate justice and social inclusion, ensuring that technological innovation benefits all citizens and supports a fair ecological transition.

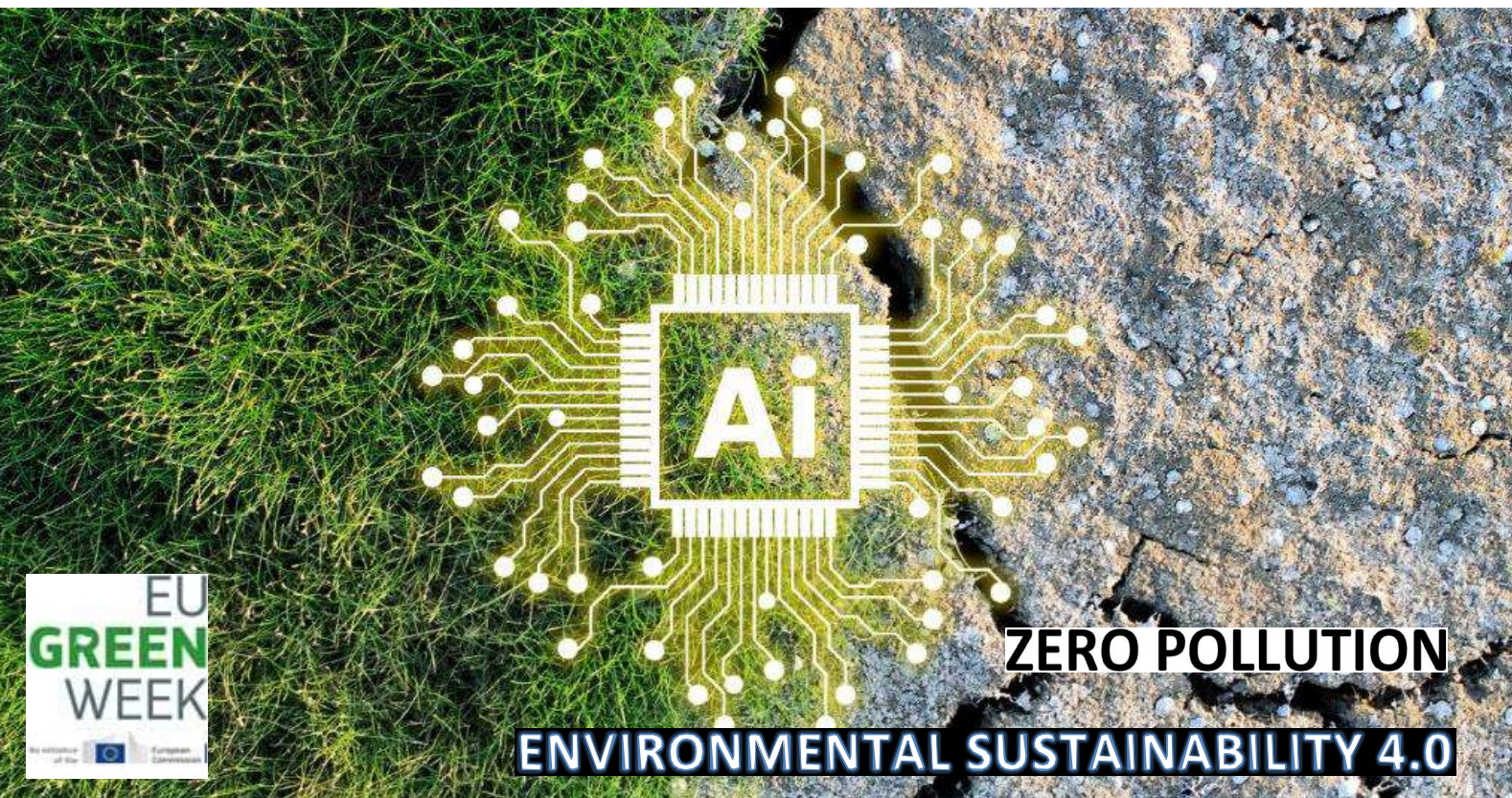
At a time when environmental challenges intersect with the need for digital transformation and social justice, the works presented demonstrate the vitality of applied research, the creativity of interdisciplinary approaches, and the commitment to the goals of the European Green Deal and the EU Zero Pollution Strategy.

This collection of abstracts reflects the wide range of topics covered — from the valorisation of local waste and clean technologies in industry, to environmental impact assessment, sustainable agriculture, air quality, effluent monitoring, energy efficiency, and the transformation of business models. The works range across different scales: from micro to macro, from local to global, and from digital to biological.

Projects such as the sustainable valorisation of invasive plant biomass, the development of biotechnological databases such as *Blue Amazon*, or the application of IoT technologies for energy efficiency show how knowledge can act as a catalyst for environmental innovation. Other proposals, such as life cycle assessment of IT equipment and the management of livestock and agro-industrial waste, demonstrate the transformative potential of science in the service of sustainability.

The "*Towards Zero Pollution*" workshop went beyond the sharing of technical knowledge. It created a space for critical reflection, for encounters between disciplines, and for dialogue across generations and sectors. By valuing local resources, promoting nature-based solutions, rethinking value chains, and exploring digital tools, participants made a significant contribution to the ongoing dialogue and practical efforts aimed at mitigating pollution. It is hoped that the abstracts presented here will serve not only as an inspiring record of the ideas shared but also as a starting point for new collaborations, projects, and sustainable policies.

*By the Organizing Committee*



A Semana Verde Europeia é um evento anual organizado pela Comissão Europeia para abordar questões ambientais e promover iniciativas sustentáveis. Em 2025, o evento tem como tema "Soluções Circulares para uma UE Competitiva", destacando o empenho da União Europeia em integrar tecnologias digitais com práticas ecológicas, com vista a uma transição verde, eficiente e inovadora.

Reúne investigadores, estudantes, professores e parceiros institucionais em torno de um objetivo comum: construir soluções científicas e tecnológicas que nos aproximem de um futuro com poluição zero. Esta abordagem alia a sustentabilidade à transformação digital, através da aplicação de inteligência artificial, Internet das Coisas (IoT) e análise de dados na monitorização ambiental, gestão inteligente de recursos e redução de emissões. A adoção destas tecnologias permite otimizar processos, reforçar a economia circular e melhorar a eficiência energética em vários sectores. A Sustentabilidade 4.0 promove também a justiça climática e a inclusão social, garantindo que a inovação tecnológica beneficia todos os cidadãos e apoia uma transição ecológica justa.

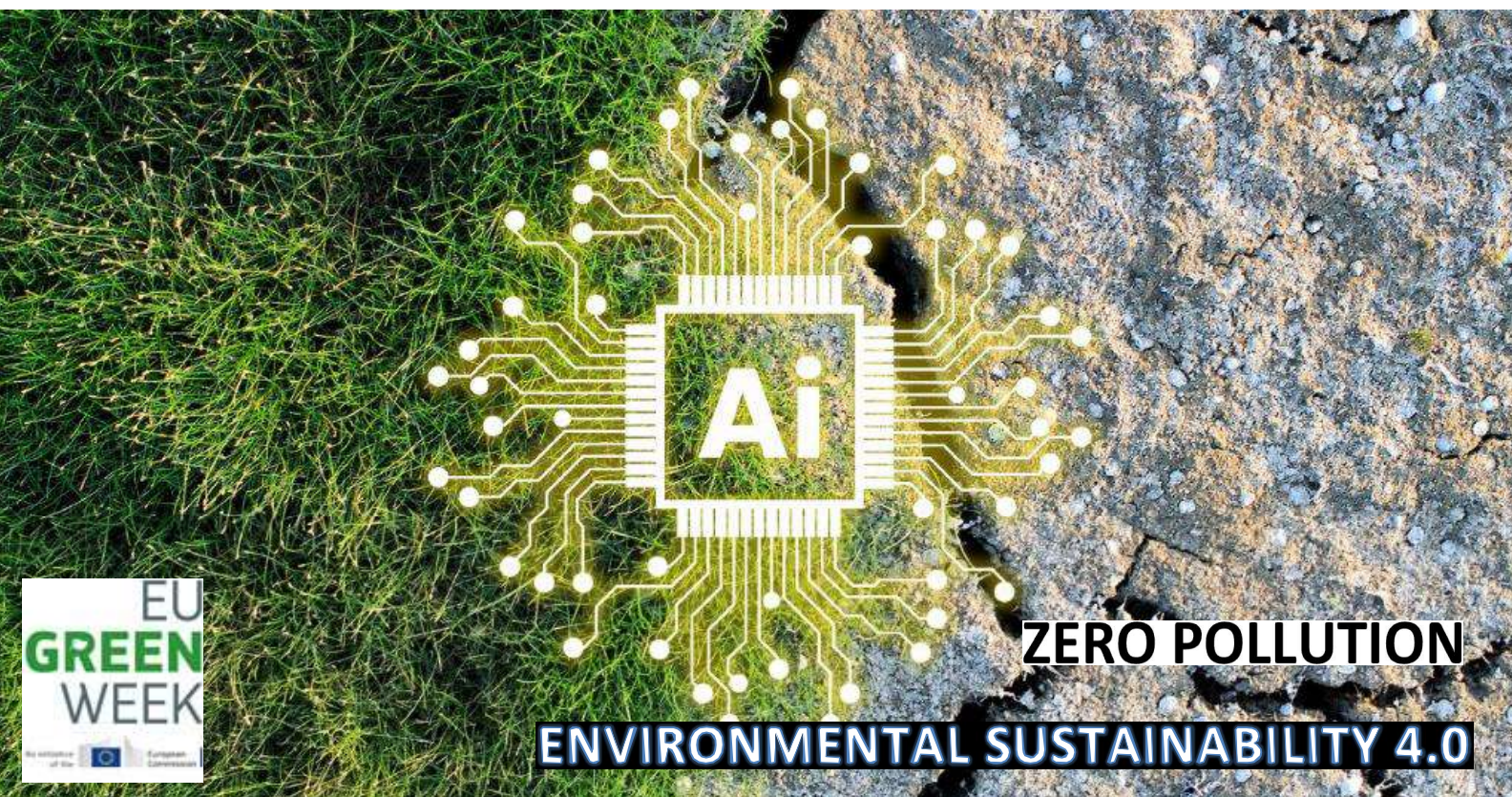
Num momento em que os desafios ambientais se cruzam com a necessidade de transformação digital e justiça social, os trabalhos apresentados demonstram a vitalidade da investigação aplicada, a criatividade das abordagens interdisciplinares e o compromisso com os objetivos do Pacto Ecológico Europeu e da Estratégia da UE para a Poluição Zero.

Esta compilação de resumos reflete a diversidade dos temas abordados — desde a valorização de resíduos locais e tecnologias limpas na indústria, à avaliação de impacto ambiental, agricultura sustentável, qualidade do ar, monitorização de efluentes, eficiência energética e transformação de modelos de negócio. Os trabalhos abrangem escalas que vão do micro ao macro, do local ao global, do digital ao biológico.

Projetos como a valorização sustentável de biomassa de plantas invasoras, o desenvolvimento de bases de dados biotecnológicas como a Blue Amazon, ou a aplicação de tecnologias IoT para eficiência energética, revelam como o conhecimento pode ser um catalisador da inovação ambiental. Outras propostas, como a avaliação do ciclo de vida de equipamentos informáticos, gestão de resíduos pecuários e agroindustriais, demonstram o potencial transformador da ciência ao serviço da sustentabilidade.

O workshop "Rumo à Poluição Zero" não se limitou à partilha de conhecimento técnico. Criou um espaço de reflexão crítica, de encontros entre áreas disciplinares e de diálogo entre gerações e setores. Ao valorizar recursos locais, promover soluções baseadas na natureza, repensar cadeias de valor e explorar ferramentas digitais, os participantes deram um contributo significativo para o debate e ação em torno da poluição e da sua mitigação. Espera-se que os resumos aqui apresentados possam ser um registo inspirador das ideias partilhadas e, acima de tudo, um ponto de partida para novas colaborações, projetos e políticas sustentáveis.

*Pela Comissão Organizadora*



## Brief description of the program

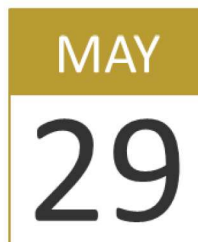


# ZERO POLLUTION ENVIRONMENTAL SUSTAINABILITY 4.0

5<sup>th</sup> International Workshop  
May 29/30, 2025

Superior School of Technology and Management  
Polytechnic of Viseu

## PROGRAM



### 09h30 – WELCOME

- **Luís Simões**, Head of the Environmental Department
- **José Abrantes**, President of the Digital Services Research Center
- **José Pereira**, Scientific Coordinator of the Research Centre for Natural Resources, Environment and Society

### 10h00 – KEYNOTE: ENVIRONMENTAL SUSTAINABILITY 4.0

- *Industry 4.0 versus Industry 5.0* | **Jana Kostalova**
- *Circular Economy Models in the Czech Industrial Context* | **Simona Munzarova**
- *Product Life Cycle Key Performance Indicators* | **Jan Vavra**

Moderation: **Isabel Brás**

### 11h00 – COFFEE BREAK

### 11h30 – ORAL PRESENTATIONS – SESSION 1

### 13h00 – LUNCH

### 14h30 – ORAL PRESENTATIONS – SESSION 2

### 16h00 – COFFEE BREAK / POSTER PRESENTATION

### 16h30 – ORAL PRESENTATIONS – SESSION 3

### 18h00 – CLOSING SESSION



EU  
GREEN WEEK  
PARTNER  
EVENTS

# ZERO POLLUTION ENVIRONMENTAL SUSTAINABILITY 4.0

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May 29/30, 2025

Superior School of Technology and Management  
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MAY

30

## PROGRAM

### 09h15 – WELCOME

- **José dos Santos Costa**, President of the Polytechnic of Viseu
- **Luís Simões**, Head of the Environmental Department
- **António Ventura**, President of the School of Technology and Management of Viseu
- **Fernando Ruas**, Mayor of Viseu
- **Elísio Oliveira**, President of the Star Institute

### 10h00 – KEYNOTE: TECHNOLOGICAL AND DIGITAL SUPPORT TO ENVIRONMENTAL SUSTAINABILITY

- *Green Electronics: Sustainable Materials for a Smarter Future* | **Elvira Fortunato**

Moderation: **Filipe Caldeira**

### 11h00 – COFFEE BREAK

### 11h15 – ENTERPRISES PITCHS: SMART CITIES

- *Building Culture for Smart(er) Cities and Communities – Highlights* | **Raúl Junqueiro**
- *Digital Innovation for Sustainability: From Theory to Impact* | **Sérgio Ivan Lopes**
- *Urban Management – An Essential Ally in Achieving Zero Pollution* | **Ana Pereira**

Moderation: **Ricardo Correia**

### 13h00 – LUNCH

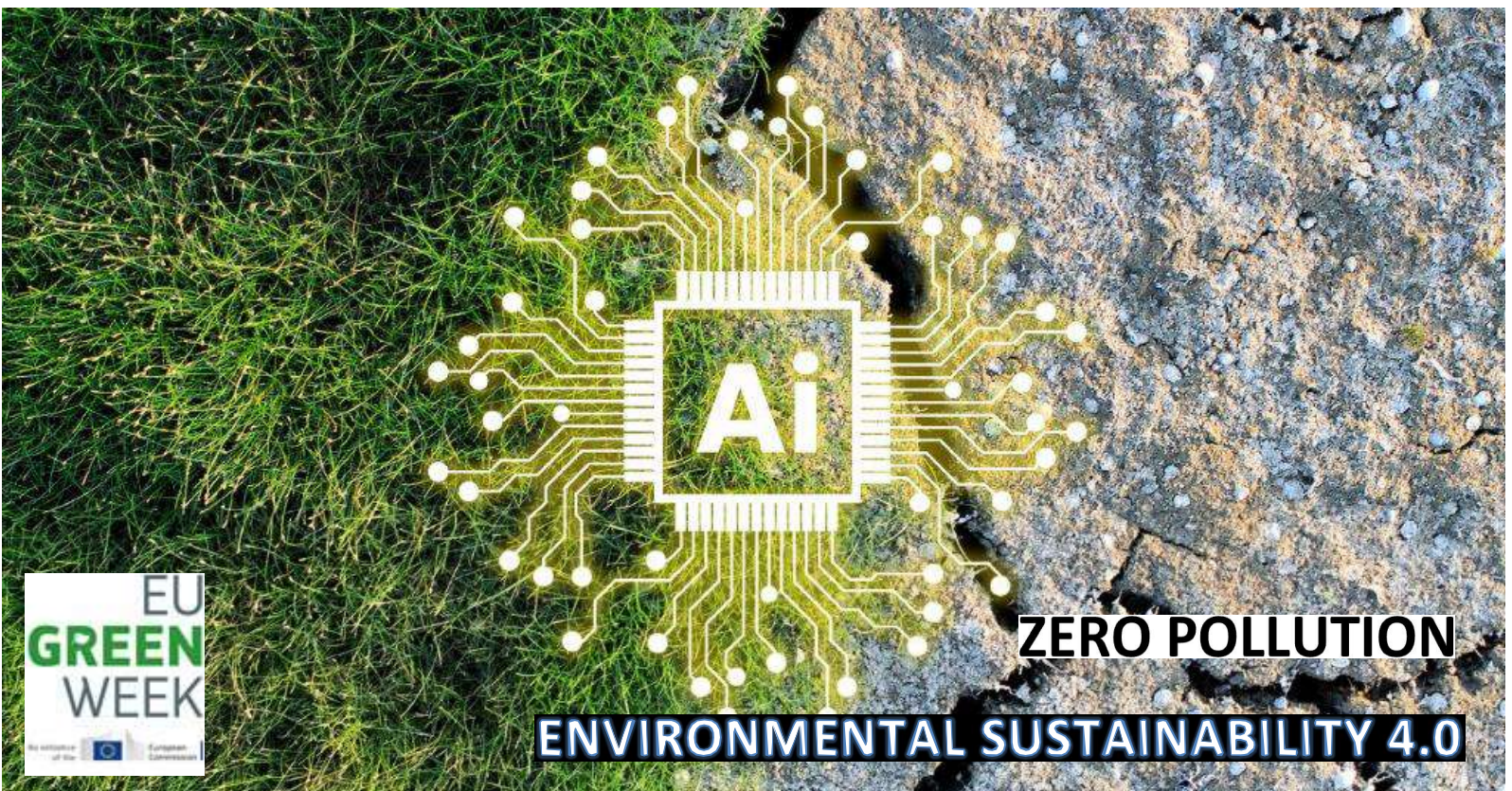
### 14h30 – SOCIAL EVENT and NETWORKING / ICEBREAK

### 15h00 – ENTERPRISES PITCHS: TERRESTRIAL AND SPACE SENSING

- *Sustainable IoT Connectivity from Space* | **André Guerra**
- *Silvanet System – Scaling Ultra Early Wildfire Detection* | **Pedro Silva**
- *Aveiro Tech City Living Lab: Technology for Smart and Sustainable Cities* | **Pedro Rito**

Moderation: **Sérgio Gomes Lopes**

### 18h00 – CLOSING SESSION



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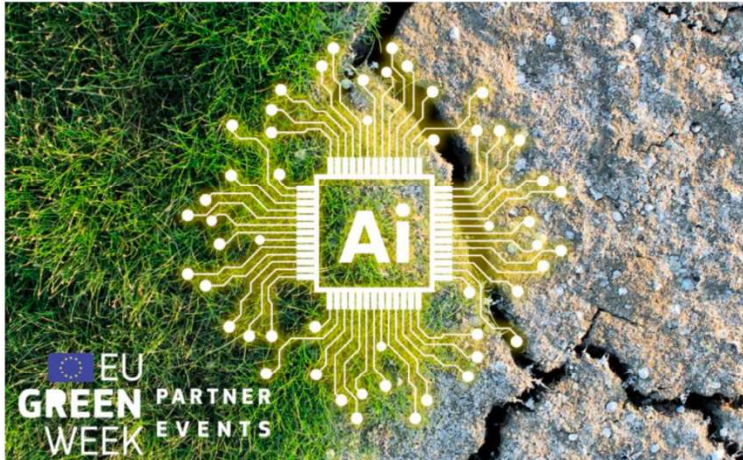
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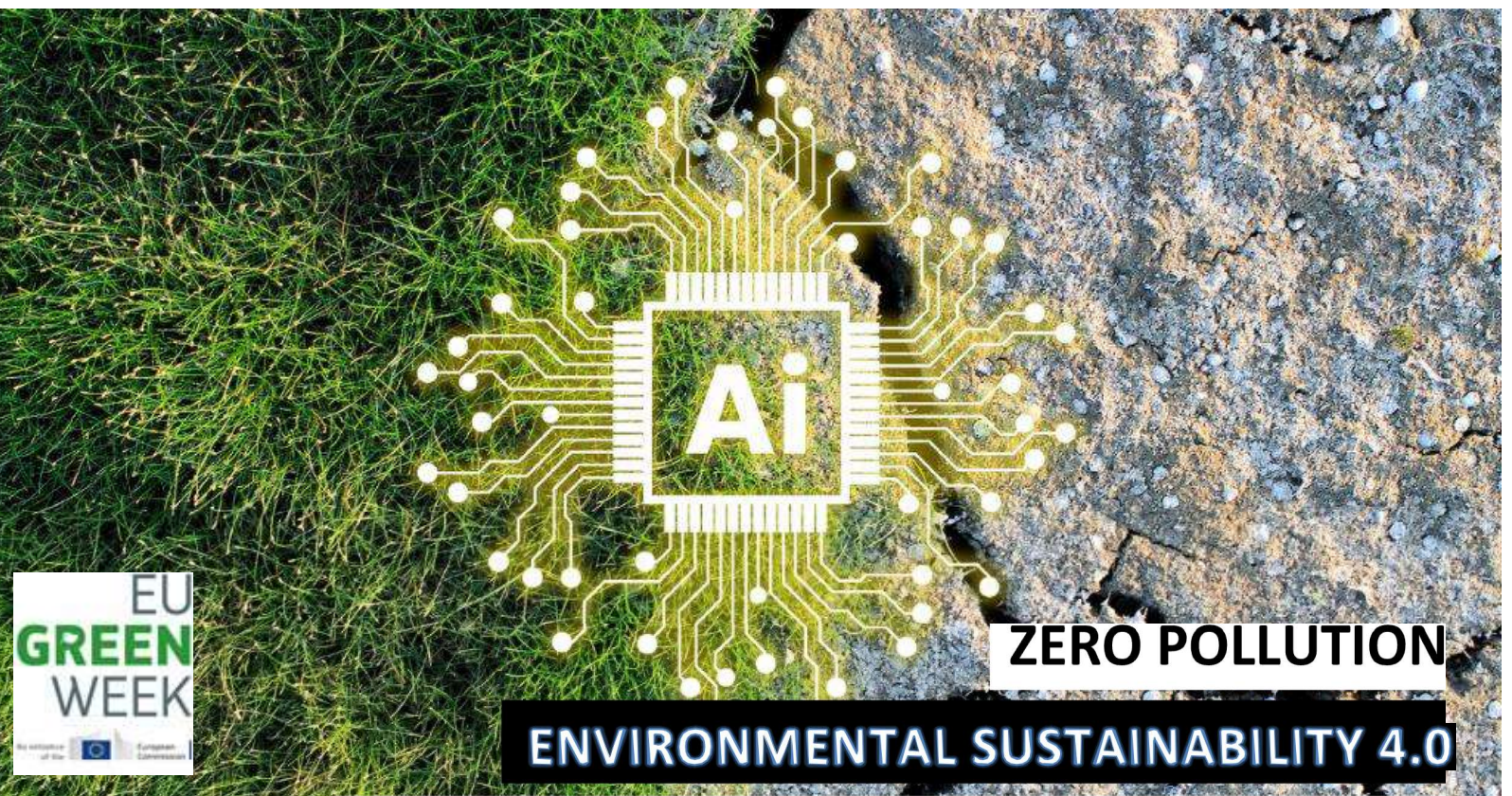
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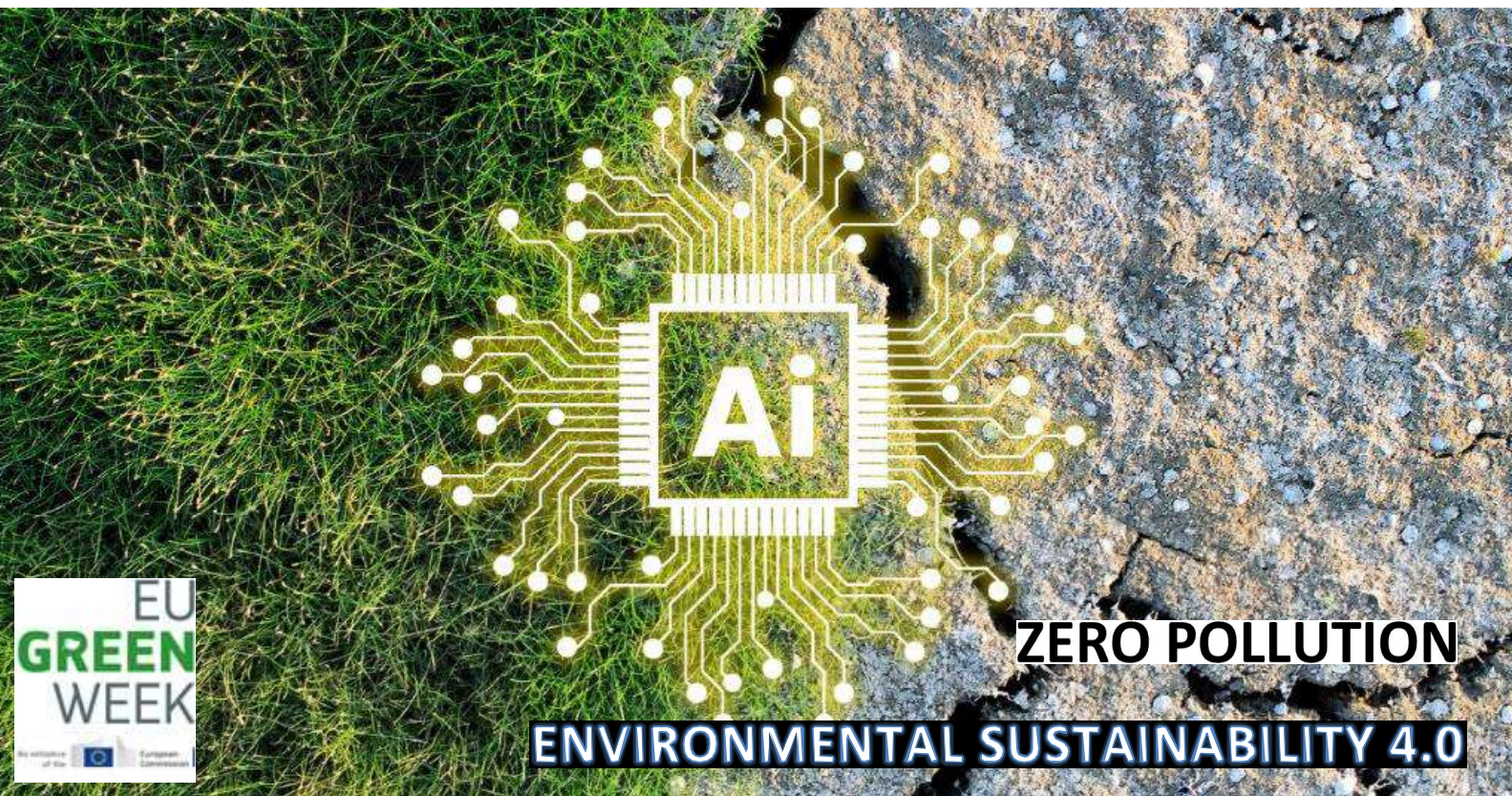
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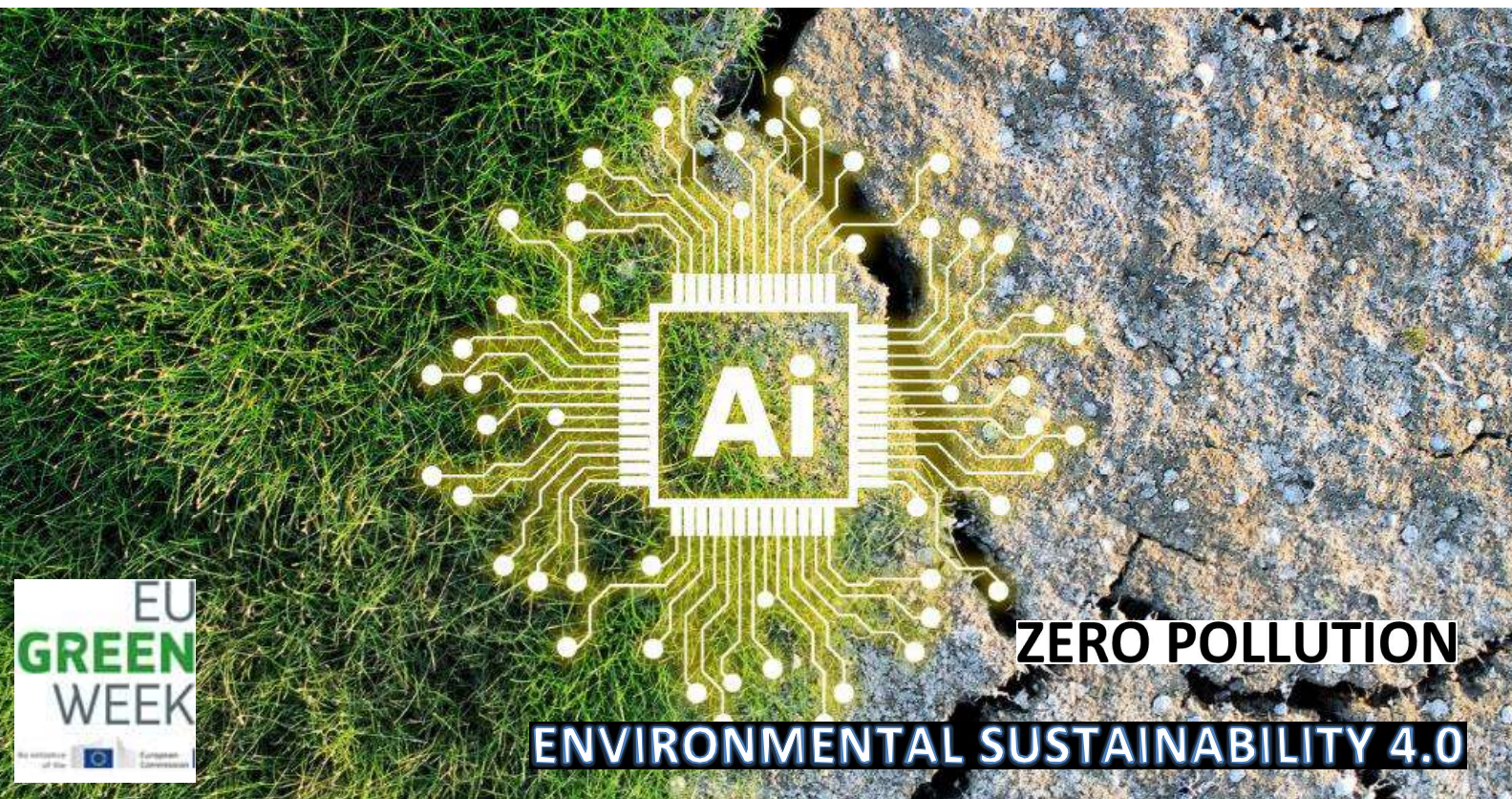




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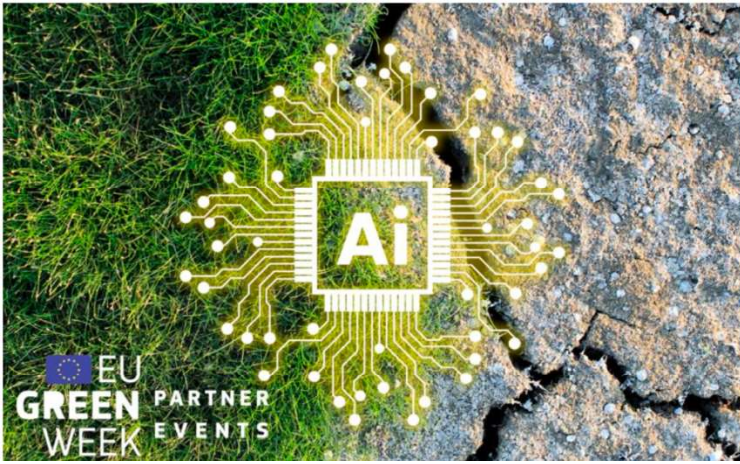
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## Sustainable valorisation of local resources to promote food security: palm wine & tiger nuts

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### Abstract

The need to utilize valuable natural resources and turn them into valuable food products is rising both for economic as well as sustainable purposes. The utilization of valuable local products helps deal with pollution, with scarcity of natural resources while also being able to provide possible alternative solutions to traditional foods and beverages, that help fight the problem of food insecurity in some areas of the globe.

This work explores the utilization of palm wine and tiger nut “milk”, to, through a fermentative process, obtain a safe alcoholic beverage, free from microbial contamination. This will allow to valorize natural resources while also preventing food insecurity.

The raw materials were obtained from Nigeria, and appropriately prepared and stored until further utilization. In brief, the sugar syrup was prepared by dissolution of fermentable sugar (sucrose), heating and cooling processes, while the tiger nut “milk” was obtained from the nuts by soaking, blending and filtering. The preparation of the fermented beverage was carried out until reaching an alcohol content between 5 and 8%. The proximate composition of the product was determined following standard chemical methodologies. Microbial as well as sensorial analyses were also conducted.

The results showed that, based on all the analyses made, including proximate composition, physicochemical properties, microbiological analyses and sensory evaluation, the sensory scores confirm that the palm wine analogue obtained competes favorably with the natural palm wine. In this way it can be used as a valuable replacement, while also exploring the utilization of alternative resources.

### Keywords

Sustainable food; Food resources; Valorization.