

SUM2026

9TH MULTIDISCIPLINARY SYMPOSIUM ON CIRCULAR ECONOMY
AND URBAN MINING / 20-22 MAY 2026 / PROCIDA, NAPLES, ITALY

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EPHA • European Public Health Alliance
Biorefine Cluster Europe
FEAD • European Waste Management Association
GWCN • Global Waste Cleaning Network
JSMCWM • Japan Society of Material Cycles and Waste Management
CEWMS • Circular Economy, Waste, Materials and Sustainability
GITISA • Italian Group of Environmental and Sanitary Engineering
AIAT • Italian Association of Environmental and Planning Engineers
AICA • International Association for Environmental Communication
UNIRIMA • Italian National Union of Recovery & Recycling Paper Companies

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DAY 1 / WEDNESDAY
MAY 20

WEDNESDAY MAY 20

MORNING

9:30 - 11:00 / MONASTERY OF SANTA MARGHERITA

OPENING SESSION AND INTRODUCTORY LECTURES

Chair / *Presidente*: Luísa Martins (PT), Andreas Bartl (AT)

WELCOME ADDRESSES / *SALUTI DI BENVENUTO*

- Luísa Martins, IRACE President - Técnico, University of Lisbon (PT)
- Andreas Bartl, TU Wien (AT)

OPENING LECTURES / *RELAZIONI DI APERTURA*

One Health and Sustainability: two sides of the same coin

by Andrew Cunningham, Institute of Zoology, Zoological Society of London (UK)

This talk highlights the relevance of the One Health approach within the context of circular economy. It shows how human activities drive both infectious diseases and biodiversity loss, linked to linear production models. Special focus will be given to livestock production as a key nexus between health, environment, and resource use.

The lecture expands to planetary health, emphasizing the impact of ecosystem degradation. It will underline the need to rethink global food systems in a sustainable, regenerative way. An integrated perspective will position circular economy as a key driver for healthier systems.

Insights into the upcoming Circular Economy Act: Anticipated instruments and background research by the Joint Research Centre of the European Commission

by Leonidas Milios, Joint Research Centre (JRC) of the European Commission

This talk will present the strategic role of the Circular Economy in strengthening Europe's sustainability and economic resilience. It will introduce the upcoming Circular Economy Act (CEA) and its relevance within the EU policy framework. Key challenges will be addressed, including critical raw materials, market fragmentation, and the gap between virgin and recycled materials.

The lecture will outline the main pillars of the CEA and its contribution to industrial competitiveness and resource security. Insights from the Joint Research Centre will highlight ongoing work supporting the development of the Act.

Particular focus will be given to End-of-Waste criteria and improved recovery of critical materials from waste streams. The talk will provide a forward-looking perspective on how EU policies can accelerate the transition to a circular economy.

At the end of the opening session, we will transfer to Palazzo D'Avalos, where the symposium will continue over the following days and where coffee breaks will be served.



 **COFFEE BREAK / 11:00 - 11:30**

WEDNESDAY MAY 20

MORNING



Andrew Cunningham
Zoological Society of London (UK)

Prof. Andrew Cunningham is a veterinarian who has worked at the Zoological Society of London since 1988, where he is Deputy Director of Science. His research focuses on infectious and non-infectious diseases affecting wildlife conservation, including disease emergence and zoonotic spill-over.

He has made key contributions to wildlife disease research, including the discovery of a new ranaviral disease in amphibians and the first definitive evidence of a species extinction caused by an infectious disease. He also co-led the international team that identified the chytrid fungus responsible for global amphibian declines, earning a CSIRO medal, and investigated vulture declines in South Asia. His work on zoonotic viruses in African bats earned him a Royal Society Wolfson Research Merit Award in 2010. He is a Fellow of the Royal College of Veterinary Surgeons and received the British Veterinary Association's Advancement of Veterinary Science award in 2025. He has served on the Quadripartite One Health High Level Expert Panel and the WHO/Europe One Health Technical Advisory Group, and currently advises the UK government on wildlife disease and vector-borne disease surveillance.



Leonidas Milios
Joint Research Centre
European Commission

Dr. Leonidas Milios is a Scientific Project Officer at the Joint Research Centre (JRC) of the European Commission. Leonidas' current research activity at the JRC is tightly related to the multiple facets of circular economy transition, including product and waste policy impact assessments, the definition of End-of-Waste criteria under the Waste Framework Directive, as well as recyclability assessment of packaging under the Packaging and Packaging Waste Regulation.

Prior to his current role, Leonidas was engaged for several years in academia, as well as in various consulting roles, both in the public and private sector within the area of resources and waste management.

Leonidas holds a PhD in Industrial Environmental Economics from Lund University, with a strong focus on circular economy policy analysis, and a MSc Degree in Environmental Engineering and Sustainable Infrastructure from the Royal Institute of Technology (KTH).



 **COFFEE BREAK / 11:00 - 11:30**

WEDNESDAY MAY 20

MORNING

SESSION A01 / 11:30 - 12:45 / BLUE ROOM - First Floor

CIRCULAR ECONOMY STRATEGIES

Chair / Presidente: Rainer Stegmann (DE)

C. Dalhammar (SE)

'Refuse' as a circular economy strategy: exnovation in product policy

N. Fraeyman, R. Cossu, S. Malfait, V. Duprez, K. Vanderwee, L. Demarre, E. Kiekens, S. Huysfeld, L. Boone, J. Dewulf (BE)

Science, the art of prioritization and recyclability

M. Somma, V. Melillo, M. Schiavoni (IT)

Extended producer responsibility and structural stagnation in essential waste streams - Behavioural evidence and institutional realignment in absorbent hygiene products

Z. Li, M. Han, G. Fang (CN)

A circular economy pathway for the wine industry driven by sector-wide cleaner production

M. Elias, D. Panepinto, M. Zanetti (IT)

Correlation Analysis of Global Copper Market Dynamics: A Dual-Perspective Approach for Demand Forecasting

SESSION B01 / 11:30 - 12:45 / PINK ROOM - First Floor

WASTE QUALITY AND COLLECTION

Chair / Presidente:

Z. Stasiškiene, E. Meiliene (LT)

From fragmented local action to coordinated circular transition: Lithuania's Green Municipalities Innovation Center model

K. Kawai (JP)

Separate collection of food waste and disposal quantities: evidence from Japanese municipalities

P. Midula, J. Hykš, O. Hjelmar, M. Šyc (CZ)

The application of up-flow percolation tests in the environmental assessment of waste materials

G. Bonifazi, G. Capobianco, R. Gasbarrone, R. Palmieri, S. Serranti (IT)

Preliminary automated Vis-SWIR spectroscopy classification of earthquake-generated construction and demolition waste (C&DW) for European Waste Catalogue (EWC) code assignment and hazard discrimination

J. Slavík, K. Rybová, B. Bannertová (CZ)

Littering, Clean Environment Index and their significance for modeling of cleaning costs - the case study of the Czech Republic



 LUNCH BREAK / 12:45 - 15:00

WEDNESDAY MAY 20

MORNING

DAY 1

SESSION C01 / 11:30 12:45 / AZURE ROOM - First Floor

WORKSHOP - CRITICAL RAW MATERIALS IN ENERGY TRANSITION

Chair / Presidente: Michal Šyc (CZ)

This workshop explores the role of critical raw materials (CRMs) in the green energy transition, focusing on recovery and recycling strategies to enhance resource security and resilience. It combines policy perspectives with technological case studies on supercapacitors, solid oxide cells, and lithium-ion batteries, highlighting urban mining, circular economy approaches, and process innovation as key pathways to reduce import dependence and support Europe's energy transition.

Introductory Lectures:

M. Šyc (CZ): Critical Raw Materials recovery - Introduction

R. Kumari, M. Šyc (CZ): Recycling of Supercapacitors: challenges and opportunities for urban mining

L.C. Villa Vargas (CZ): Recycling of nickel from solid oxide cells: efficiency in hydrometallurgical recycling processes

A. Bulkin, P. Kamenikova, M. Šyc (CZ): Recycling of lithium-ion batteries: influence of battery material composition and topology on efficiency of selected recycling processes

M. Tamaro, G. Fiorentino, A. Zucaro (IT): Circular economy as tools for the ecological transition: the case of critical raw materials and the contribution of ENEA

SESSION D01 / 11:30 12:45 / RED ROOM - Ground Floor

WORKSHOP - ADVANCING THE FUTURE OF STEEL SLAG IN CONSTRUCTION

Chair / Presidente: Antonio Conforti (IT)

The workshop aims at presenting the state of the research regarding the PRIN research project "STEELCRETE", funded by the Ministry of the University and Research, Italy (MUR), on the application of steelmaking slags in concrete for structural applications.

Introductory Lectures:

A. Conforti (IT): Introduction - Steel production in Italy via Electric Arc Furnace (EAF): main by-products and waste streams

A. Conforti (IT): Overview of the STEELCRETE Project: objectives and research framework

F. Lollini (IT): Mix design strategies and durability performance of concretes with EAF slag

F. Faleschini (IT): Structural applications of EAF slag in concrete

A. Abbà (IT): Environmental aspects related to the use of EAF slag



 LUNCH BREAK / 12:45 - 15:00

WEDNESDAY MAY 20

AFTERNOON

SESSION A02 / 15:00 - 16:15 / BLUE ROOM - First Floor

PLASTICS

Chair / Presidente: Pierre Hennebert (FR)

T.F. Astrup, J.B. Horsholt, T. Senanu, C. Hindsgaul, P. Moloney, B. Hauge (DK)
Unlocking industrial plastic circularity: enablers and barriers revealed

G. Marmora, C. Ferrara, V. Roselli, G. De Feo (IT)
Reusable and single-use packaging in fresh fruit distribution: thresholds of environmental convenience from an LCA perspective

G. Beggio, A. Ndiforngu, R. Dall'Anese, T. Bonato, M.C. Lavagnolo (IT)
PFAS in recycled plastics: from detection to preliminary estimation of humane exposure

M. Pasetto, G. Beggio, M.C. Lavagnolo, G. Giacomello, M. Jamshidi (IT)
Environmental and mechanical performance of asphalt mixtures incorporating mixed plastic waste

SESSION B02 / 15:00 - 16:15 / PINK ROOM - First Floor

ENERGY IN CIRCULAR ECONOMY

Chair / Presidente:

L. Barnikel, D.M. Yazan (NL)
From local energy transition to positive energy districts: a systemic roadmap for Aadorp/The Netherlands

M. Nogueira, J. Bastos, O. Moreira, P. Brito, R. Fragoso (PT)
RE-FEED: Renewable Energy Production at Farm Level for Energy Efficiency and Defossilisation

A.L. Fernando, C. Rodrigues, C. Dias, J. Costa, B. Barbosa, E. Alexopoulou (PT)
Low indirect land use change (ILUC) industrial crops to bioenergy, biofuels and bioproducts in marginal soils: site-specific environmental potential and limitations of poplar to bioenergy and biochar



 COFFEE BREAK / 16:15 - 16:45

WEDNESDAY MAY 20

AFTERNOON

DAY 1

SESSION C02 / 15:00 - 16:15 / AZURE ROOM - First Floor

CIRCULAR ECONOMY STRATEGIES IN DIFFERENT COUNTRIES OF THE WORLD

Chair / Presidente:

C.C.C. Cheng, B. Steuer (HK)

What circular economy policies drive waste reduction and recycling in East Asia? Comparing patterns in Japan, South Korea, Taiwan, Singapore and Hong Kong

L. Casarano (IT)

Navigating precarity and potential: informal waste picking and the challenges of formalisation on Pemba island

S. Jovanovic, V. Jankovic-Milic, M. Džunic (RS)

Resource efficiency and urban quality of life: a multidimensional sustainability assessment in Serbia

A. Fileni, M. La Monica, L. Fraccascia, L. Cutaia (IT)

Drafting a national-scale application for industrial symbiosis at Italian level: first results based on an input-output analysis

V. Marttila, W. Ruismäki, M. Rääkkönen (FI)

MFA-based economic value modelling for smartphone recycling in Finland

SESSION D02 / 15:00 - 16:15 / RED ROOM - Ground Floor

WORKSHOP - ADVANCING THE FUTURE OF STEEL SLAG IN CONSTRUCTION

Chair / Presidente: Ana Paula Ribeiro (PT), Karey Maynor (US)

This workshop will explore the emerging role of carbon dioxide hydrates in carbon management within CCUS strategies and circular economy frameworks.

CO₂ hydrates offer promising solutions for dense, reversible storage, as well as for CO₂ separation, transport, and integration with energy and resource systems. The session will begin with short presentations covering the fundamentals of hydrate formation, stability, and kinetics, followed by recent technological developments. Particular attention will be given to utilisation pathways, including capture, separation, temporary storage, transport, and hybrid approaches with mineralisation, conversion, and energy storage.

Interactive discussions will address key scientific, technical, and economic challenges limiting large-scale deployment. By bringing together experts from multiple disciplines, the workshop aims to define the practical role of CO₂ hydrates and identify priorities for future research and innovation.



 COFFEE BREAK / 16:15 - 16:45

WEDNESDAY MAY 20

AFTERNOON

SESSION A03 / 16:45 - 18:00 / BLUE ROOM - First Floor

DECISION TOOLS IN CIRCULAR ECONOMY

Chair / Presidente:

A. Arias, E. Katsou (GB)

Framework for sustainable biofuels: indicator development and pathway to digital toolkit and ecolabeling

I. Marjanović, J.J. Stanković, M. Stanojević (RS)

Benchmarking circular economy progress in EU member states: composite index approach

F. Cecchini, V. Innocenzi, M. Pizzuti, K. Gallucci, A. Di Giuliano, M. Prisciandaro (IT)
Integrated renewable methanol–high temperature fuel cell systems for circular carbon utilization: a multiscale modeling and sustainability perspective

E. Korotenko, H. Rechberger, J. Jadrný, O. Cencic, M. Šyc (CZ)

Optimization of waste management technologies using statistical entropy approach: applicability to full-scale systems and enhancement of resource recovery

D. Fosco, M. De Molfetta, P.A. Renzulli, B. Notarnicola, D. Sica, S. Supino (IT)

UAV methane MRV as a tool for circular economy management

SESSION B03 / 16:45 - 18:00 / PINK ROOM - First Floor

ARTIFICIAL INTELLIGENCE IN CIRCULAR ECONOMY

Chair / Presidente:

P. Hennebert, H. Mamo, G. Beggio (FR)

Artificial intelligence–assisted education and problem-solving for hazardous chemical waste management in East and Central Africa

M. Abukmeil, Y. Wu, F. Di Maio (NL)

AI-driven multi-sensor material identification in construction and demolition using a robotic drilling platform

H. Weber, G. Koinig, J. Aberger, T. Fink, A. Tischberger-Aldrian (AT)

Object-based sorting of post-consumer textiles at pilot scale using AI-supported models



 WELCOME APERITIF DINNER & KARAOKE NIGHT / 18:45 - 00:00

WEDNESDAY MAY 20

AFTERNOON

DAY 1

SESSION C03 / 16:45 - 18:00 / AZURE ROOM - First Floor

CIRCULAR ECONOMY IN MANAGING INDUSTRIAL WASTE

Chair / *Presidente*:

E. Pitacco, K. Brunelli (IT)

Unlocking the full recycling potential of hot rolling residues

P. Janos, J. Vlcek (CZ)

Implementing Circular Economy in energy-intensive industry: where success is decided

D.M. Yazan (NL)

From industrial symbiosis to hubs for circularity: systemic advancements, technology scale-up, and business insights from IS2H₄C project

M. Ghadimi Soyeni, K. Brunelli, M. Brotto, M. Bellotto (IT)

Optimization of Aluminothermic process for Ferrosilicon Production from White Ladle slag

S. Salhofer, G. Kain, F. Idam (AT)

Reuse and repair in the construction sector – Is this a beneficial option? A box-type windows case study

SESSION D03 / 16:45 - 18:00 / RED ROOM - Ground Floor

WORKSHOP - MULTIDISCIPLINARY ISSUES WITH PFAS IN CIRCULAR ECONOMY

Chair / *Presidente*: Tarek Rashwan, F. Khodaparastan (UK), M. Johansson (SE)

PFAS are widely used in products ranging from firefighting foams to cosmetics and comprise thousands of persistent synthetic compounds. Their toxicity and ability to bioaccumulate pose significant environmental and health risks.

Technologies such as activated carbon and ion exchange resins are used to remove PFAS from water, while more contaminated matrices require advanced treatments. Their presence represents a major challenge for the circular economy, as extremely low concentrations are needed to ensure safe reuse. Despite rapid technological and regulatory progress, particularly in the EU, PFAS remain difficult to manage due to their chemical diversity and resistance to conventional treatments.

The workshop will address key challenges and foster discussion on integrating PFAS management into circular economy approaches.



 **WELCOME APERITIF DINNER & KARAOKE NIGHT / 18:45 - 00:00**

WEDNESDAY MAY 20

SOCIAL EVENT

WELCOME APERITIF DINNER ON THE TERRACE AND KARAOKE EVENING

APERICENA DI BENVENUTO SULLA TERRAZZA E SERATA KARAOKE

Santa Margherita Monastery, Terrace / from 18:45 to midnight

To mark the opening of the Symposium, we are delighted to invite participants to a memorable welcome apericena set in an extraordinary location: the terrace of the Church of Santa Margherita. Perched on a promontory overlooking the sea, this stunning venue—where the opening session will be held in the morning—offers breathtaking views of Ischia and Capri, providing the perfect backdrop to begin our time together.

The evening will unfold with an apericena featuring a rich selection of appetizers and traditional specialties from Procida, offering a first, authentic taste of the island's culinary heritage.

As the sun sets, the event will continue inside the Monastery with a lively and engaging karaoke night - an informal and spirited opportunity to connect, unwind, and, for those who wish, take the stage and join the fun.

Throughout the evening, guests will also enjoy an open bar serving a curated selection of local alcoholic beverages and beers.

The event is free for symposium delegates but reservation is mandatory by Wednesday h. 15:00.

Accompanying persons should purchase the ticket (€ 35 + VAT 22%).

Per inaugurare il Simposio, siamo lieti di invitare i partecipanti a una memorabile apericena di benvenuto in una cornice straordinaria: la terrazza della Chiesa di Santa Margherita. Arroccata su un promontorio affacciato sul mare, questa splendida location - sede della sessione di apertura del mattino - offre una vista mozzafiato su Ischia e Capri, creando l'atmosfera perfetta per dare inizio al nostro incontro.

La serata si aprirà con un'apericena ricca di specialità tradizionali procidane, per offrire un primo, autentico assaggio della cultura gastronomica dell'isola.

Al calare del sole, l'evento proseguirà all'interno del Monastero con una serata di karaoke vivace e coinvolgente, un'occasione informale per socializzare, rilassarsi e, per chi lo desidera, mettersi in gioco e scatenarsi!

Nel corso della serata sarà inoltre disponibile un open bar con una selezione di alcolici locali e birre.

L'evento è gratuito per gli iscritti al Simposio ma è obbligatorio prenotarsi entro le ore 15:00 di mercoledì.

Eventuali accompagnatori dovranno acquistare il biglietto (€ 35,00 + IVA 22%).



DAY 2 / THURSDAY
MAY 21

THURSDAY MAY 21

MORNING

SESSION A04 / 9:30 - 10:45 / BLUE ROOM - First Floor

MATERIAL RECYCLING FROM WEEE

Chair / Presidente:

L. Grima-Carmena, S. Pocoví-Martínez, F. Bosch-Mossi, J. Navarro-Sánchez, J. Castellano-Espinosa, C. Silvestre-Ramos (ES)

Electrochemical leaching of rare earth elements and iron from end-of-life permanent magnets using waste brines and valorization as inorganic pigments

A. Polsinelli, A. Di Crescenzo, M. De Marco, P. Ghorbanpour, P. Romano, F. Vegliò, N.M. Ippolito (IT)

Optimized recycling approaches for silicon and silver in photovoltaic waste

M. D'Arcangelo, A. Becci, A. Amato, F. Beolchini (IT)

Synergistic PCB-Black Mass processing: Fe-regenerated leaching for efficient metal extraction

B. Boriani, A. Becci, F. Beolchini, M. del Mar Cerrillo-Gonzalez, M. Villen-Guzman, A. Amato (IT)

A low impact sequential electro dialysis strategy for critical metal recovery from end of life lithium ion batteries

S. Bastami, M.J. Lacadena, P. Toniolo (XX)

Enhancing metal recovery from battery black mass using hydrogen peroxide-assisted leaching

SESSION B04 / 9:30 - 10:45 / PINK ROOM - First Floor

BIOPLASTICS

Chair / Presidente:

G. Bonifazi, G. Capobianco, P. Cucuzza, S. Serranti (IT)

Recycling-oriented identification of fossil-based plastics and bioplastics in packaging waste using hyperspectral imaging and hierarchical classification

W. Peng, Y. Xu, H. Zhang, F. Lü, P. He, X. Zhou (CN)

Enhanced biodegradation of PBAT via enzymatic facilitation under simulated industrial composting

C. Sica, V.A. Palumbo, C. Copat, G. Oliveri Conti, M. Ferrante (IT)

Microwave-assisted aqueous extraction of Poly(3-hydroxybutyrate) (PHB) from *Spirulina platensis*: characterization and preliminary biodegradation for sustainable packaging applications



 **COFFEE BREAK / 10:45 - 11:15**

THURSDAY MAY 21

MORNING

SESSION C04 / 9:30 - 10:45 / AZURE ROOM - First Floor

CIRCULAR ECONOMY IN CONSTRUCTION & DEMOLITION WASTE MANAGEMENT

Chair / Presidente: *Flora Faleschini (IT)*

S. Pezzutto, P. Thöni, G. Libardoni (IT)

The PROSUST Project - Planning tool for sustainable construction in South Tyrol

T. Iannuzzi, F. Rossi, F. Corsini, M. Niero, M. Fundoni, A.C. Galvao, M. Frey (IT)

Assessing Circular Business Models Configurations from the Buyer's Perspective: A Multi-criteria Analysis in the Construction Industry

S. Malinconico, F. Paglietti, S. Bellagamba, E. Zucca, A. Aurigemma, G. Bonifazi, S. Serranti (IT)

Asbestos in soil: safety procedures for sampling

A. Piemonti, G. Plizzari, S. Sorlini (IT)

Can recovered inert materials from street sweeping waste be used for concrete production? State of the art and future perspectives

J. Vizek, K. Orion (EE)

Influence of fine-fraction construction and demolition waste on the strength and moisture performance of concrete

SESSION D04 / 9:30 - 10:45 / RED ROOM - Ground Floor

LEGAL ISSUES IN CIRCULAR ECONOMY & IN END-OF-WASTE PROCEDURES

Chairs / Presidenti: *Maria Pettersson, Oskar Johansson (SE)*

This session explores the legal and regulatory challenges shaping the transition to a circular economy, focusing on waste legislation, eco-design standards, and compliance with EU directives. It will address how legal frameworks influence waste-related activities, and the classification, handling, and reuse of waste materials.

Introductory Lectures:

O. Johansson (SE): Introduction: Waste or Resource

C. Dalhammar (SE): EU product laws as drivers and barriers for circular business solutions

M. Pettersson (SE): Mining Waste Recycling - The Critical Raw Materials Paradox

P. Hennebert, E. Dereviankine (FR)

Two propositions for EU-wide by-product and End-of-Waste procedures reforming the WFD: self-assessment and science-based tripartite approach



COFFEE BREAK / 10:45 - 11:15

THURSDAY MAY 21

MORNING

SESSION A05 / 11:15 - 12:30 / BLUE ROOM - First Floor

TREATMENT FOR TEXTILE WASTE RECYCLING

Chair / Presidente: Andreas Bartl (AT)

E. Sykacek, F. Quartinello, C. Schimper, A. Mautner (AT)

Influence of disruptors in the re-processing of mixed fiber textile wastes

S. Rosenbusch, A. Bartl (AT)

Screening of green solvents for cotton recycling: decolorization and selective fiber isolation

D.M. Dereje, Z. Smania, S. Zanatta, M. Modesti, P. Ostellari, S. Gross, M. Carraro (IT)

Sustainable valorization of textile waste via nanocellulose extraction using Deep Eutectic Solvents

L. Van Belleghem, V. Lemmens, S. Rosenbusch, M. Degelin, R. Dirix, N. Depope, N. Van Velthoven, A. Bartl, D. De Vos (BE)

Selective depolymerization of elastane via secondary amines as an alternative to conventional dissolution systems: initial results

N. Depope, A. Bartl (AT)

Impact of alkaline pretreatment on PET recovery and thermal stability in DES-Based recycling of textile blends

SESSION B05 / 11:15 - 12:30 / PINK ROOM - First Floor

RESIDUES FROM CARS

Chair / Presidente:

M. Ljunggren, D. Das, S. Henriksson (SE)

Circular management of critical raw materials in the European vehicle fleet

A. Masiello, A. Marotta, G. Costanzo, A. Spagnuolo, C. Vetromile, M.R. di Cicco,

F. De Cristofaro, M.L. Sorrentino, C. Lubritto (IT)

From recycled end-of-life tires to smart sensing flooring: an applied circular economy pathway for livestock housing

C. Amon, H. Morgan, X. Wang, I.D. Williams (GB)

Preliminary results for the use of flow cytometry as a new technique to quantify tyre wear particles

A. Benato, R. Bertani, M. Dabalà, S. Gross, M.C. Lavagnolo, A. Manzardo, M. Mozzone, F. Picano, P. Sgarbossa, A. Stoppato (IT)

Car fluff valorisation through unconventional treatments



LUNCH BREAK / 12:30 - 15:00

THURSDAY MAY 21

MORNING

DAY 2

SESSION C05 / 11:15 - 12:30 / AZURE ROOM - First Floor

URBAN DRAINAGE IN CIRCULAR ECONOMY

Chair / Presidente:

K. Houlihan, H. Morgan, X. Wang, I.D. Williams (GB)

Urban rivers under strain from wastes: a thematic synthesis on sources, stressors, and solutions

J. Sansalone, I. Gnecco, A. Palla (US)

Granulometric distribution of metals on particulate residuals transported in urban drainage

E. Pulvirenti, L. Falqui, M. Ferrante, G. Oliveri Conti (IT)

Innovative filter to reduce microplastic pollution and protect aquatic ecosystems and human health

S. Raje, J. Sansalone (US)

Recovery Tools for Particulate Matter in Traffic-Dominated Urban Microclimates Benefits Health, Ecology and Sustainability

R. Stegmann (DE)

Ecological waste and water management in Eco-Cities

SESSION D05 / 11:15 - 12:30 / RED ROOM - Ground Floor

WORKSHOP - CIRCULAR BIOECONOMY & INSECT-BASED SOLUTIONS FOR ENVIRONMENTAL SUSTAINABILITY

Chairs / Presidenti: Ana Paula Ribeiro, Luísa Martins (PT)

This workshop explores innovative strategies for environmental sustainability through circular economy approaches, focusing on insect-based biorefineries and waste valorisation. Inspired by the INSECTERA project, it examines how insect biomass—particularly Black Soldier Fly by-products—can be converted into valuable materials such as chitin and chitosan for sustainable and health-related applications. It offers insights into the scientific, technological, and societal dimensions of circular bioeconomy models, including resource recovery and industrial symbiosis. The workshop fosters interdisciplinary dialogue among researchers, industry stakeholders, and policymakers on sustainable innovation and green transition pathways.

Introductory Lectures:

L. Martins (PT): INSECTERA Project Overview: Circular Economy Approaches to Insect-Based Biorefineries

A.P.C. Ribeiro (PT): From Insect Waste to High-Value Biomaterials: Chitin and Chitosan Applications



LUNCH BREAK / 12:30 - 15:00

GIOVEDÌ 21 MAGGIO

MATTINA

Le sessioni in lingua italiana si terranno al primo piano del Palazzo della Cultura, situato a pochi metri da Palazzo D'Avalos. I partecipanti sono invitati a seguire la segnaletica dedicata per raggiungere la sala.

SESSION E05 / 11:15 - 12:30 / PALAZZO DELLA CULTURA - Primo Piano WORKSHOP - INFRASTRUTTURE URBANE IN TERRITORI CIRCOLARI

Presidenti: Anna Attademo, Federica Paragliola, Sara Piccirillo, Marina Rigillo (IT)

La necessità di ideare e proporre iniziative incentrate sull'economia circolare ha ormai acquisito un ruolo centrale nelle politiche dell'Unione Europea. In Italia, il Piano Nazionale di Ripresa e Resilienza (PNRR 2021-2026, MISSIONE 2), nel recepire le strategie per la transizione ecologica e digitale (COM/2019/640 final; COM(2020) 98 final), incentiva la sperimentazione di processi socialmente condivisi per l'economia circolare e la mitigazione climatica nelle aree urbane. Si definisce, così, un contesto di finanziamento della ricerca molto favorevole, che offre margini di azione per nuovi approcci al progetto dello spazio pubblico con un focus sull'innovazione sociale intesa come convergenza di saperi, capacità del fare, consapevolezza di ruoli e responsabilità istituzionali.

Muovendo da tali premesse, la seconda edizione del workshop ha l'obiettivo di finalizzare la discussione sulla possibilità di prototipare processi decisionali finalizzati a realizzare in modo proattivo le condizioni di governance necessarie per favorire la creazione di filiere circolari alla scala locale, generando di opportunità di sviluppo economico e l'implementazione di politiche innovative di welfare. In particolare, si vuole utilizzare il contesto scientifico e culturale del SUM 2026 per portare l'attenzione verso esperienze di co-progettazione funzionali ad implementare una infrastruttura urbana dedicata al riuso e all'upcycling di prodotti scartati ma ancora, tecnicamente, considerati rifiuto.

Il workshop prende avvio dalle ricerche condotte presso il DiARC inerenti la progettazione di un'attrezzatura urbana per la circolarità che risponda ai presupposti di sostenibilità dell'abitare e alle esigenze di servizi e spazi pubblici per la città; un'attrezzatura denominata Circular Urban Hub dedicata ospitare attività di ri-distribuzione, riparazione, rivendita, riuso e upcycling di prodotti volte ad estendere la vita utile di oggetti. Il sistema degli Hub è concepito come una rete di spazi di quartiere in cui convivono attività per l'incontro, l'educazione sociale e il tempo libero, ed attività commerciali destinate alla micro e piccola impresa e finalizzate alla riparazione, redistribuzione, riuso e re-design di particolari tipologie di prodotti (segnatamente quelli del tessile, dell'arredo e del RAE), in accordo con la Direttiva Rifiuti (UE) 2018/851 e con la Direttiva (UE) 2024/1799 che sancisce il diritto alla riparazione dei beni di consumo. L'idea è



 **LUNCH BREAK / 12:30 - 15:00**

GIOVEDÌ 21 MAGGIO

MATTINA



quella di supportare attivamente la cultura della transizione ecologica e digitale, associando l'attività di raccolta e gestione di prodotti scartati con pratiche socialmente condivise e accettate, diffuse in modo capillare sul territorio e al contatto diretto con i cittadini:

«[...] the future is not [...] infrastructure and software as a service, but [...] a lot of loosely connected mini-services [that] can be easily assembled like Lego blocks and on top of which you can build agile and resilient applications» (<https://pierrelevyblog.com>, accessed August 21, 2018).

In termini di governance, si tratta di intervenire attraverso l'attivazione di pratiche circolari che intercettano comportamenti quotidiani, facilitando la creazione di diverse condizioni di mercato e di posti di lavoro, ma anche indirizzando la comunità verso azioni di autogestione e di sussidiarietà i cui vantaggi possano essere immediatamente percepiti. Tali interventi operano sia il piano dei flussi materiali che quello delle relazioni sociali, lavorando su una dimensione di scala che, grazie all'uso della rete e delle tecnologie abilitanti, intercetta parimenti la dimensione di vicinato, quella urbana e regionale.



LUNCH BREAK / 12:30 - 15:00

THURSDAY MAY 21

AFTERNOON

SESSION A06 / 15:00 - 16:15 / BLUE ROOM - First Floor

ROLE OF CIRCULAR ECONOMY IN WASTEWATER TREATMENT

Chair / *Presidente*:

M. Leone, A. Zoccali, M. Grana, S. Vito (IT)

Closing the gap between emission inventories and real operation: full-scale greenhouse gas monitoring in wastewater treatment plants

F. Cecchini, V. Innocenzi, M. Prisciandaro, G. Mazziotti di Celso (IT)

Life Cycle Assessment of an industrial wastewater treatment plant: a comparison of environmental impact using fossil and renewable energy sources

E. Lee, K.J. Min, C. Park, K.Y. Park (KR)

Carbon source-dependent aerobic granulation for anaerobic digested side-stream treatment

M. De Sanctis, S. Murgolo, G. Mascolo, C. Di Iaconi (IT)

An innovative plant for municipal wastewater recovery

M. Dassatti, V. Innocenzi, G. Mazziotti di Celso, T. Dragani, M. Prisciandaro (IT)

Comparative Assessment of PFAS Removal Technologies: Membrane Processes versus Advanced Oxidation Processes for Sustainable Water Reuse

SESSION B06 / 15:00 - 16:15 / PINK ROOM - First Floor

INSECTS BIOREFINERY

Chair / *Presidente*:

V. Grossule (IT)

LarWaR process for WW treatment and resource recovery: state of art

L.M.D.R.S. Martins, A.P.C. Ribeiro, A. Figueiras (PT)

Advancing the EU circular bioeconomy: valorization of black soldier fly bio-waste into high-value cosmetic ingredients

M. Henjak, V. Grossule (IT)

Treatment of fish farming wastewater using Black Soldier Fly larvae: treatability test and resource recovery assessment

A.P.C. Ribeiro, L.M.D.R.S. Martins, A.O. Figueiras (PT)

Differences in solubility and crystallinity of chitosan extracted from seafood waste and black soldier fly larvae



 **COFFEE BREAK / 16:15 - 16:45**

THURSDAY MAY 21

AFTERNOON

DAY 2

SESSION C06 / 15:00 - 16:15 / AZURE ROOM - First Floor

WORKSHOP - RUOLO DEL DEPOSITO SUL TERRENO DEI RESIDUI DELL'ECONOMIA CIRCOLARE / ITALIAN SESSION

Chair / Presidente: Raffaello Cossu (IT)

Relazioni introduttive:

R. Cossu

Ruolo dei sink nell'economia Circolare

A. Artuso, E. Cossu

La riqualificazione paesaggistica e morfologica di una ex-cava di argilla come esempio applicato di sink geologico

SESSION D06 / 15:00 - 16:15 / RED ROOM - Ground Floor

WORKSHOP - CIRCULARITY IN HEALTH CARE WASTE MANAGEMENT

Chair / Presidente:

L. Demarré, K. Vanderwee, E. Kieckens, V. Duprez, S. Malfait, N. Fraeyman (BE)

Towards circular healthcare: implementing reusable materials with a focus on sustainability, cost, and logistics

E. Tommasi (IT)

Sustainability and circularity of processes for climate-resilient healthcare services



 **COFFEE BREAK / 16:15 - 16:45**

GIOVEDÌ 21 MAGGIO

POMERIGGIO

Le sessioni in lingua italiana si terranno al primo piano del Palazzo della Cultura, situato a pochi metri da Palazzo D'Avalos. I partecipanti sono invitati a seguire la segnaletica dedicata per raggiungere la sala.

SESSION E06 / 15:00 - 16:15 / PALAZZO DELLA CULTURA - Primo Piano WORKSHOP - RUS: RUOLO DEGLI STUDENTI PER L'ECONOMIA CIRCOLARE NELLE UNIVERSITÀ / PARTE 1

Presidenti: Eleonora Perotto, Maria Cristina Lavagnolo (IT)

Maria Cristina Lavagnolo, Università degli Studi di Padova
Apertura lavori e moderazione

Eleonora Perotto, Politecnico di Milano

Gli esiti principali dell'indagine GdL R&R sul coinvolgimento degli studenti nelle politiche universitarie di gestione e prevenzione rifiuti

Maria Concetta Dragonetto, CONAI, e Pasquale Lepore / Officine Sostenibili
Le linee guida RUS-CONAI: un primo bilancio e le possibili prospettive future

Elena Semenzin, Università Cà Foscari Venezia, e Chiara Genta, Politecnico di Torino

Le attività del TT Comunità studentesca in ambito prevenzione e gestione rifiuti

Coordinano gli interventi degli studenti delle università RUS:

Nastasija Koprivica, Università Ca Foscari Venezia, e Zeno Dal Piaz, Università Bicocca

Lightning Talks: "Il ruolo degli studenti nelle policy universitarie di prevenzione e gestione rifiuti"



 **COFFEE BREAK / 16:15 - 16:45**

GIOVEDÌ 21 MAGGIO

POMERIGGIO



Le sessioni in lingua italiana si terranno al primo piano del Palazzo della Cultura, situato a pochi metri da Palazzo D'Avalos. I partecipanti sono invitati a seguire la segnaletica dedicata per raggiungere la sala.

SESSION E07 / 16:45 - 18:00 / PALAZZO DELLA CULTURA - Primo Piano

WORKSHOP - RUS: RUOLO DEGLI STUDENTI PER L'ECONOMIA CIRCOLARE NELLE UNIVERSITÀ / PARTE 2 - DISCUSSIONE

Presidente: Giovanni De Feo (IT)

Interventi programmati:

Franco De Martino, Università degli Studi di Salerno
Il ruolo degli studenti nel progetto CONAI-UNISA

Giulia Romano, Università degli Studi di Pisa
Il ruolo degli studenti nel progetto CONAI-UNIPI

Marta Giurato, CONAI

Le proposte di CONAI per ampliare la collaborazione con la comunità studentesca alla luce delle recenti esperienze in ambito universitario
Interventi a cura del pubblico

Conclusioni

Maria Cristina Lavagnolo, Università degli Studi di Padova, e Eleonora Perotto – Politecnico di Milano

Per informazioni: rus-risorserifiuti@polimi.it

in collaborazione con:



UNDER THE STARS OF CORRICELLA / from 20:00 to midnight

THURSDAY MAY 21

AFTERNOON

SESSION A07 / 16:45 - 18:00 / BLUE ROOM - First Floor

RESOURCE RECOVERY AND ENVIRONMENTAL IMPACTS FROM ASHES

Chair / Presidente:

X. Ling, H. Li, D. Yue (CL)

Thermodynamic simulation on behaviours of typical heavy metals during back-to-furnace process of MSWI fly ash

D. Bonanno, A. Luciano, L. Gurreri, G. Benina, G. Mancini (IT)

A potential pathway towards the use of Etna volcanic ash for biobased fertilizers

E. Moslehi, E. Larsson, G.A. Seisenbaeva, C. Tunsu (SE)

Selective leaching and crystallization methods to produce potassium and phosphate fertilizers from poultry litter fly ash

SESSION B07 / 16:45 - 18:00 / PINK ROOM - First Floor

MICROALGAE AND PLANTS CULTIVATION & RESOURCE RECOVERY

Chair / Presidente:

V.A. Riggio, D. Alpe, M. Zanetti (IT)

Planar led photobioreactors for microalgal cultivation and CO₂ biofixation: platform, scalability and a chlorella flour case study

V.A. Palumbo, C. Sica, C. Copat, G. Oliveri Conti, L. Falqui, M. Ferrante (IT)

Sustainable extraction and valorization of carotenoids from *Chlorella* spp. through the exploitation of industrial waste streams for algal growth and bioactive compound production

M. Dassatti, E. De Amicis, D. Marinidis, V. Innocenzi, B. Mattei, M. Prisciandaro (IT)

Cavitation-assisted recovery of lipids from *Chlorella vulgaris* and *Chlorella sorokiniana*: a preliminary experimental evaluation



UNDER THE STARS OF CORRICELLA / from 20:00 to midnight

THURSDAY MAY 21

AFTERNOON

DAY 2

SESSION C07 / 16:45 - 18:00 / AZURE ROOM - First Floor

WORKSHOP - ACTIVATION OF IRACE FOCUS GROUPS

Chairs / *Presidenti*: R. Cossu (IT), L. Martins (PT)

A key feature of IRACE will be its Focus Groups, each dedicated to addressing specific issues in the Circular Economy. These small expert groups will collect data, engage in multidisciplinary dialogue, and explore key “why, what, and how” questions. Their goal is to define problems, investigate solutions, and produce outputs such as position papers, research proposals, and policy recommendations, while engaging in public communication.

Proposed list of topics include:

Ecodesign and materials selection for circularity / Contaminants prevention in products / Strategies for Microplastics minimisation / Symbiosis Produces/recyclers / Health risks from microplastics and contaminants accumulation in products / Accumulation and release of contaminants from recycled products / Fate of undifferentiated Biowaste / Sink on Soil / Recycling of critical raw materials / Sustainable patterns for plastics recovery / Thermal treatment in Circular Economy / Management and fate of asbestos waste within CE strategies / Circular Economy & Wastewaters / New recovering opportunities / Optimised legal-frame for Circular Economy / Communication about Sustainable Circular Economy strategies / Recycling of space materials and equipment

Each Focus Group will operate within a defined time frame, with expected deliverables including policy inputs, research initiatives, and communications with authorities and the public.

SESSION D07 / 16:45 - 18:00 / RED ROOM - Ground Floor

WORKSHOP - SUSTAINABLE AND CIRCULAR ARCHITECTURE

Chairs / *Presidenti*: Marina Rigillo, Federica Paragliola, Maria-Anna Segreto (IT)

F. Paragliola, M. Rigillo, A. Cignarella, M. Segreto (IT)

Innovation and research for sustainable and circular construction. Material-process-design

S. Longo, M. Mistretta, F. Nocera, M. Cellura, M. Derito, F. Guarino (IT)

Life-cycle resource consumption of hydroponic green roof systems

L. Amenta, N. Fierro, P. De Martino (IT)

Mapping the metabolism of city-port threshold areas: infrastructures, public spaces and circular strategies for wastescapes



UNDER THE STARS OF CORRICELLA / from 20:00 to midnight

THURSDAY MAY 21

SOCIAL EVENT

UNDER THE STARS OF CORRICELLA: DINNER AND MUSIC NIGHT / SOTTO LE STELLE DELLA CORRICELLA: CENA E DJ SET
LA LOCANDA DEL POSTINO + BLU LOUNGE BAR / h. 20:00

For the second evening of the Symposium, we invite you to experience something truly authentic in the enchanting Marina Corricella, the most characteristic fishing village of Procida. Colorful houses overlooking the sea, quiet narrow alleys, and the complete absence of cars make this place unique, where time seems to have stood still. The evening will be the perfect opportunity to breathe in the atmosphere of this small fishing village and fully immerse yourself in its authenticity.

In this extraordinary setting, also made famous by Massimo Troisi's film *Il Postino*, you will enjoy a seafood dinner featuring fish freshly caught in the morning by the local fishermen of the village. Long convivial tables will be set up to share flavors and moments of togetherness in a truly authentic "sea-to-table" experience. Seats are limited! In order to join the event, **book your place upon your arrival no later than thursday h. 17:00.**

Cost: € 60 + VAT 22% per person

Starting from 22:30 the evening will then continue just a few steps away at Blu, a former boat storage space transformed into a cozy lounge bar, featuring a **DJ set and entertainment**. Please note that beverages are not included and will be at the participant's expense.

Per la seconda serata del Simposio, vi invitiamo a vivere un'esperienza autentica nella suggestiva Marina Corricella, antico borgo di pescatori di Procida. Tra case colorate sul mare e vicoli senza tempo, gusterete una cena di pesce appena pescato in un'atmosfera conviviale e genuina.

Nella locanda resa celebre dal famoso film "Il Postino" di Massimo Troisi, potrete immergervi nella vera essenza dell'isola.

*La serata proseguirà al Blu, elegante lounge bar, con DJ set e intrattenimento. Per prendere parte all'evento è **necessario prenotare il proprio posto entro e non oltre le ore 17:00 di giovedì.***

Costo: € 60 + IVA 22% a persona

*Per coloro che non partecipano alla cena, la serata prosegue al porto della Corricella, a pochi passi dalla Locanda del Postino. Saremo lieti di accogliervi al Blu, un ex deposito di barche trasformato in un elegante lounge bar di design, con **DJ set e intrattenimento**. (le bevande non sono incluse).*



DAY 3 / FRIDAY
MAY 22

FRIDAY MAY 22

MORNING

SESSION A08 / 9:30 - 10:45 / BLUE ROOM - First Floor

MANAGEMENT OF DIFFERENT ORGANIC WASTE FRACTION

Chair / Presidente: Federico Illuminati (IT)

H. Kumasaka (JP)

Overcoming institutional barriers to circular economy implementation: private-led Food Loss and Waste (FLW) reduction in Japan

S.S.H. Dias, A. Leal Vieira Cubas (BR)

Bioremediation applied to sewage sludge: technologies and challenges in the circular economy

J.W.C. Wong, D. Li (CN)

A Low C/N Strategy for High-Throughput Food Waste Digestate Composting by Reducing Bulking Agent Demand

K. Orupõld, M. Kriipsalu, V. Kuusemets, H. Lepisk, T. Tamm, K. Lass, H. Raave, M. Shanskiy (EE)

Sheep wool: from an economically marginal by-product to a functional soil amendment

M. Grana, M. Leone, A. Zoccali, L. Maestroni, E. Ficara (IT)

Integrated biorefinery for resource recovery from wastewater sludge and municipal organic waste: an industrial application

SESSION B08 / 9:30 - 10:45 / PINK ROOM - First Floor

CRITICAL RAW MATERIALS

Chair / Presidente:

M. Cera, G.P. De Gaudenzi, A. Bjerke, G. De Gioannis, F. Asunis, A. Muntoni, A. Serpe (IT)
pH-controlled selective leaching of Co and W from hardmetal waste using lactic acid

I. Alessandri, P. Barra, E. Bontempi, M.F. Casula, D. Chiriu, S. Cocco, A. Cornelio, P. Cosseddu, G. De Gioannis, C. Di Santo, C. Doria, P. Franceschini, S. Javaid, M. Lovatti, A. Mascia, A. Muntoni, C. Olla, L. Pilia, V.M.I. Piro, P.C. Ricci, R. Ruggiero, G. Sarzana, M. Schirru, I. Vassalini, A. Zanoletti, A. Serpe (IT)

SMaRT PCBs: Sustainable materials recycling technology for printed circuit boards

A. Bonoli, F. La Marca (IT)

The technological supply chain of permanent magnets: critical issues and opportunities in the Italian context

S. Cota, L. Melandri, P. Fleming Rubio, L. Itani, T. Tolio, G. Muscatello, M. Zanolletto (IT)
Advancing circularity of Rare Earth Elements and Permanent Magnets in Europe: the PERMANET approach

A. Guerrer, M. Carraro, S. Gross (IT)

Deep Eutectic Solvents (DES) for the sustainable recovery of Critical Raw Materials used in electrocatalysts synthesis



COFFEE BREAK / 10:45 - 11:15

FRIDAY MAY 22

MORNING

SESSION C08 / 9:30 - 10:45 / AZURE ROOM - First Floor

WORKSHOP - CLOSING THE LOOP FOR TEXTILES?

Chair / Presidente: Andreas Bartl (AT)

Textile waste is rapidly increasing, while true fiber-to-fiber recycling remains limited. Regulations promote circularity, but complex materials and inadequate sorting hinder progress. As a result, most textiles are downcycled, incinerated, or exported. The session will highlight key bottlenecks and discuss whether current solutions can enable truly circular textile systems.

Introductory lectures:

G. De Feo, M. Napoli, R. Gargano, U. Vietri, D.R. Cirasuolo (IT)

Fast fashion and textile waste: education as a strategic lever for textile urban mining and circular consumption transition

H. Weber (AT): NIR-based sorting technologies for post-consumer textile waste

L. Van Belleghem (BE): Selective removal of elastane from blended textiles to enable recycling

A. Mautner (AT): Disruptors in textile recycling: challenges in processing mixed fiber waste streams

S. Rosenbusch (AT): Solvent-based pretreatment strategies for cotton-rich textile waste

Moderated round-table discussion with the participants.

SESSION D08 / 9:30 - 10:45 / RED ROOM - Ground Floor

WORKSHOP - STRATEGIES FOR SUSTAINABILITY EDUCATION IN MASTER'S PROGRAMS

Chair / Presidente: Enrico Boccaleri (IT)

This workshop brings together participants to develop a framework for an international interdisciplinary Master's course in Sustainability. Using the SISTEM Master program as a case study, it explores innovative digital and multidisciplinary teaching approaches. The session will discuss how to scale this model globally, integrating diverse fields and aligning with major policies like the European Green Deal and the UN SDGs.

Workshop Agenda:

- Introduction: Presentation of the EDUNEXT project and the SISTEM Master model and teaching programme.
- Case Study Analysis: The 4 Educational Clusters of SISTEM.
- Analysis of the integrated approach covering Earth Resources, Human Impact (Energy/Waste), Sustainability Strategies (Circular Economy, Supply Chain), and Legal/Soft Skills.
- Interactive Session: Co-designing the International Curriculum. Participants will be divided into working groups to brainstorm an international syllabus that integrates key international partners into the SISTEM framework, designing specific profiles and topics.
- Conclusion & Roadmap.

FRIDAY MAY 23

MORNING

SESSION A09 / 11:15 - 12:30 / BLUE ROOM - First Floor

ENERGY PRODUCTION FROM BIOMASS

Chair / Presidente:

H. Gohar (IT)

Pyrolysis for energy & material recovery from biomass

C.L. Verdezoto, T. Ender, J. Sprafke, M. Nelles (DE)

Valorisation of pig slurry solid fraction into bio-based materials

F. Illuminati (IT)

Decentralised energy production from agriculture waste

J.A. Gutierrez González, J.K. Chenwi Minang, M. Muñoz Morales, J. Llanos López, J. Villaseñor Camacho (ES)

Towards improving biomethane production from solid biowaste by electrohydrolysis pretreatment

SESSION B09 / 11:15 - 12:30 / PINK ROOM - First Floor

CIRCULAR ECONOMY CASE STUDIES FROM UNIVERSITIES

Chair / Presidente:

R.C.C. Mesquita Micaroni, C.S.G. Penteado, A.P. Bortoleto (BR)

Waste prevention program at University of Campinas (UNICAMP)

L. Adami, L. Giacomini, A. Rosca, A. Draghici, E.C. Rada (IT)

EU educational projects on plastic: the case of EDU4PlasticC

A. Leal Vieira Cubas, A. De Luca Sampaio Canto, A.R. Aguiar Dutra, A.P. Provin, J. Baltazar Salgueirinho Ozorio de Andrade Guerra (BR)

Circular fashion in practice: sustainability education through denim upcycling in design programs



13:00 - 14:30

BLUE ROOM - First Floor

**IRACE - INTERNATIONAL ASSOCIATION
ON CIRCULAR ECONOMY
GENERAL ASSEMBLY**

The general assembly is reserved for Irace members. Sum participants are nonetheless welcome to attend! Read more about the Association at pag. 68-69.



LUNCH BREAK / 12:30 - 15:00

SESSION C09 / 11:15 - 12:30 / AZURE ROOM - First Floor**WORKSHOP - CRUCIAL ISSUES IN CRITICAL RAW MATERIALS MANAGEMENT**

Chairs / *Presidenti*: Angela Serpe, Maria Cristina Lavagnolo (IT)

Critical Raw Materials (CRMs) are at the core of the green and digital transitions, yet their supply raises complex environmental, political, and social challenges. Extraction from primary resources is often associated with significant environmental impacts, intensive energy and water consumption, as well as risks to ecosystems and local communities. At the same time, the geographical concentration of resources and supply chains creates geopolitical vulnerabilities and strategic dependencies. In this context, the use of secondary resources—through recycling and recovery from end-of-life products—represents a key strategy to mitigate these issues, although it also entails technological, economic, and regulatory challenges.

This contribution analyzes the interconnections between environmental sustainability, supply security, and social responsibility, highlighting the crucial role of the circular economy and innovation in recovery processes to build more resilient, ethical, and sustainable value chains.

SESSION D09 / 11:15 - 12:30 / RED ROOM - Ground Floor**WORKSHOP - SUSTAINABLE AND CIRCULAR WM IN DEVELOPING COUNTRIES & EMERGING ECONOMIES**

Chairs / *Presidenti*: Roland Ramush (AT)

This workshop examines how solid waste management systems in low-income and emerging economies can be developed, scaled, and financed.

It draws on practical experience to identify key constraints and enabling conditions for sustainable system transitions. The session is structured around three areas: case studies of waste management projects, focusing on stakeholder roles and capacity building; financing strategies, with emphasis on International Financial Institutions and investment approaches; and reflections on whether system change is driven by technology, governance, or their integration.

Designed as an interactive exchange between researchers, practitioners, financiers, consultants and municipalities, the workshop encourages participants to reflect on why well-intended investments often fall short when confronted with socio-economic, cultural, and environmental complexities, and what this implies for the design of coherent, context-appropriate, and sustainable future waste management interventions.



 **LUNCH BREAK / 12:30 - 15:00**

FRIDAY MAY 23

AFTERNOON

SESSION A10 / 15:00 - 16:15 / BLUE ROOM - First Floor

CONVERSION OF ORGANIC WASTE TO BIOCHAR

Chair / Presidente: Hamad Gohar (IT)

S. Klempetsani, M. Kyriazi, M. Avramidi, E.-A. Giouni (GR)

Nutrient recovery from secondary biomass streams: pathways for converting organic residues into circular fertilizers

D. Scrinzi, D. Bona, R. Basso, M. Zorzi, G. Andreottola, L. Fiori, S. Silvestri (IT)

Simulated scenarios of hydrothermal carbonization integrated in an industrial plant treating municipal organic waste

M.A. Rafique, A. Singh Sidhu, H. Gohar, G. Beggio, M.C. Lavagnolo, F. Faleschini (IT)

Parameter optimisation for enhanced CO₂ sequestration in biochar

F. Khodaparastan, C. Batty, C. Wilkinson, J. Bowen, A. Fraser-McDonald, C. Switzer, M.A.B Zانونi, L. Kinsman, T.L. Rashwan (GB)

Volatile and semi-volatile organic compounds released during biomass valorisation in applied smouldering systems

SESSION B10 / 15:00 - 16:15 / PINK ROOM - First Floor

CIRCULAR STRATEGIES FOR WEEE

Chair / Presidente:

S. García Galán, F.J. Iglesias Godino, J. Contreras Ubric, F.A. Corpas Iglesias, J.E. Muñoz Expósito (ES)

SICAPERMA: Building a Resilient European Value Chain for Nd-Fe-B Permanent Magnet Recycling

B. Kopacek (AT)

Circular Economy Business Models – Key for Resilience and the “Clean Industrial Deal”?

T. Naseri, K. Kuchta (DE)

From Scrap to Black Mass: Process Heterogeneity and Pretreatment Challenges Toward Direct Regeneration of LFP Batteries

A. Zanoletti (IT)

Recovery of strategic metals from spent batteries using microwaves



 **COFFEE BREAK / 16:15 - 16:45**

SESSION C10 / 15:00 - 16:15 / AZURE ROOM - First Floor**MICROPLASTICS CONTAMINATION AND REMOVAL**

Chair / Presidente:

C.A. Cossu, V. Poli, L. Litti, M.C. Lavagnolo (IT)

Microplastics as a global threat in water, ocean and land

D. Santoro, K. Nasr Esfahani, S. Mancini, O. Santoro, T. Masi, C. Pablos, M.D. Molina, J. Marugán, S.F. Camelo, M.I. Leão Silva, C. Manaia, O. Nunes, M. Lois, J.L. Romalde, A. Cobelo, E. Abollo, S. Pascual, M. López, R. Ríos, G.P. Di Sansebastiano, F. Ugolini (IT)

Bioreactive storage for reclaimed wastewater: an integrated barrier against micropollutants, viruses, antibiotic resistance and microplastics

S. Kanwal, V. Poli, L. Litti, M.C. Lavagnolo (IT)

Assessing microplastics release in supply water

SESSION D10 / 15:00 - 16:15 / AZURE ROOM - First Floor**WORKSHOP - THE ROLE OF ENERGY IN THE CIRCULAR ECONOMY**

Chair / Presidente: A. Fantappiè (IT)



 **COFFEE BREAK / 16:15 - 16:45**

FRIDAY MAY 23

SOCIAL EVENT

FINAL PROCIDA DINNER WITH LIVE MUSIC / CENA PROCIDANA DI CHIUSURA CON MUSICA DAL VIVO

La Pergola Restaurant, Via Salette 10, Procida / h. 20:30

Taxi service (round trip) provided by the organizers / servizio taxi a/r incluso.

Meeting point: Piazza dei Martiri, from 19:45

The Symposium's closing dinner will take place in the beautiful setting of La Pergola restaurant, in the heart of the island, where you will be welcomed beneath an authentic Procida lemon grove, immersed in an intimate and evocative atmosphere. The evening will feature live music performed by a band and will be enriched by a moment dedicated to local tradition: the dressing of the Graziella, the island's traditional costume. The celebration will then continue with a lively dance party with live music.

50% of the price is included in the Symposium entrance fee. The remaining 50% will be paid by each delegate and amounts to € 45 + VAT 22%.

Reservation is mandatory no later than Thursday h. 13:00 from the Secretariat desk

Accompanying persons should purchase the full ticket (€ 90 + VAT 22%) from the Secretariat.

Per concludere al meglio il SUM2026, tutti i partecipanti sono invitati alla serata procidana finale: un momento speciale per salutarci e celebrare insieme, in un'atmosfera conviviale, questi giorni di lavoro e condivisione.

La cena di chiusura del Simposio si terrà nella splendida cornice del ristorante La Pergola, nel cuore dell'isola, dove sarete accolti sotto un autentico limoneto procidano, immersi in un'atmosfera intima e suggestiva.

La serata sarà accompagnata da musica dal vivo eseguita da una band, e arricchita da un momento dedicato alla tradizione locale: la vestizione della Graziella, l'antico abito tipico dell'isola di Procida.

A seguire, la festa continuerà con un coinvolgente party danzante con musica dal vivo, per celebrare insieme fino a notte fonda.

Il 50% del costo della cena e della serata è incluso nella quota d'iscrizione al Simposio, la restante metà è a carico dei partecipanti ed ammonta a € 45,00 + IVA 22%.

Prenotazione obbligatoria presso la segreteria entro giovedì ore 13:00.

Eventuali accompagnatori dovranno acquistare il biglietto intero (€ 90,00 + IVA 22%).



POSTER SESSION
SESSIONE POSTER

POSTER SESSION

SESSIONE POSTER

Posters will be accessible to Symposium delegates at all times in Palazzo D'Avolos, ground floor / *La sessione Poster sarà accessibile per l'intera durata del Simposio e sarà allestita al piano terra di Palazzo d'Avalos.*

P01 / V. Forlini, F. Marzotto, S. Gross, M. Carraro (IT)

Extraction of metals from industrial wastewater sludge with deep eutectic solvents: a proof of concept

P02 / R. Ozola-Davidane, A. Salmina, S. Ozolina-Grinevica (LV)

Upcycling polyphenol-rich food industry by-products into high-value cosmetic and biomedical materials

P03 / T. Bansal (HK)

Smart and integrated B2B based solar circularity platform

P04 / M.G. Macavei, C. Marculescu, R. Patrascu, A. Magdziarz (RO)

Analysis for valorization pathways of animal bone waste

P05 / V.-C. Gheorghe, G. Petcu, C. Marculescu, A. Magdziarz (RO)

Study on the potential of chicken bones biochar to produce sustainable and high-value materials

P06 / A. Estokova, M. Cambal Holosova, M. Fabianova, M. Jas (SK)

LCA analysis of the cement composites with recycled materials

P07 / D. Sica, F. Smaldone, S. Supino, B. Esposito (IT)

Bridging climate change and circular economy: employability skills profiling in the agrifood sector

P08 / R. Ozola-Davidane, J. Karasa, S. Ozolina-Grinevica, J. Kostjukovs (LV)

Secondary phosphorus mining from wastewater using natural mineral sorbents

P09 / J. Havranová, S. Cernanský (SK)

Microbial volatilization of arsenic and antimony during bioleaching of mining waste

P10 / J. Havranová, S. Cernanský (SK)

Influence of microscopic filamentous fungi on soil reaction during bioleaching of mining waste rich in Arsenic and Antimony

P11 / P. Basinas, M. Luxová, K. Chamrádová (CZ)

Characterization and degradation behaviour of commercial bioplastic shopper bags in long term anaerobic digestion assays

P12 / M.L. Tello Martín, S. Hilali, E. Stierlin, H. Baarset, M. Pérez (ES)

Dried salmon sludge as a soybean meal substitute in king oyster mushroom cultivation: yield performance and nutritional value of *Pleurotus eryngii* within the SAFE Horizon Europe project

P13 / *V. Piergrossi, A. Zucaro, M. Pietrantonio, G. Fiorentino, S. Pucciarmati, L. Cafiero, M. Tammaro (IT)*

Experimental recycling processes to recover materials from photovoltaic panels

P14 / *M. Dassatti, M. Prisciandaro, V. Innocenzi (IT)*

Experimental Studies on Sustainable Treatment of Textile Wastewater through Hydrodynamic Cavitation Technology and Hybrid Solutions: a Review

P15 / *T. Marinkovic, I. Berezni, N. Tasic, M. Muhadinovic, N. Stanisavljevic, B. Batinic (RS)*

Systematic approach to collection schemes of electric and electronic waste: case study of Novi Sad

P16 / *I. Berezni, T. Marinkovic, A. Kokanovic, M. Muhadinovic, N. Stanisavljevic, B. Batinic (RS)*

Household awareness and participation in e-waste management in Novi Sad, Serbia

P17 / *C. Rodrigues, V.G.L. Souza, B. Sayin, I. Coelho, A.L. Fernando (PT)*

Valorization of opuntia ficus-indica cladodes: from agricultural residue to sustainable food packaging

P18 / *Y. Shao, Y. Yuan (CN)*

A comparison of hydrochar and hydrothermal humic acid from simulated garden waste for soil improvement