

# SUM2022

SIXTH SYMPOSIUM ON CIRCULAR ECONOMY AND  
URBAN MINING / 18-20 MAY 2022 / CAPRI / ITALY

---

Organised by / Organizzato da:



Under the patronage of:

Con il patrocinio di:



With the scientific support of:

Con il supporto scientifico di:

Denmark University of Technology (DK)  
Hamburg University of Technology (DE)  
The University of Hong Kong (HK)  
University of Naples "Federico II" (IT)  
University of Padua (IT)  
Sapienza University of Rome (IT)  
University of Southampton (UK)  
Tsinghua University (CN)  
TU Wien (AT)

Promoted by / Promosso da:

EPA - United States Environmental Protection Agency (US)  
Umweltbundesamt - German Environment Agency (DE)  
Korea Society of Waste Management (KR)  
Institute of Waste Management of Southern Africa (ZA)  
CEC4EUROPE - Circular Economy Coalition for Europe (AT)  
ESA - Environmental Service Association (UK)  
CEWMS - Circular Economy, Waste, Materials and Sustainability (IT)  
GITISA - Italian Group of Sanitary Landfilling (IT)



# CONTENTS

# SOMMARIO

PRESENTATION <i>PRESENTAZIONE</i>	6-7
SCIENTIFIC COMMITTEES & ORGANISING SECRETARIAT <i>COMITATI SCIENTIFICI E SEGRETERIA ORGANIZZATIVA</i>	8-11
SYMPOSIUM STRUCTURE AND CONFERENCE HALLS <i>STRUTTURA DEL SIMPOSIO E SALE CONGRESSUALI</i>	12-13
INSTRUCTIONS FOR SESSION CHAIRS & SPEAKERS <i>ISTRUZIONI PER PRESIDENTI DI SESSIONE E RELATORI</i>	14-15
USEFUL INFORMATION <i>INFORMAZIONI UTILI</i>	16
VIRTUAL PLATFORM AND MOBILE APP <i>PIATTAFORMA VIRTUALE E APP</i>	17-18
SOCIAL EVENTS <i>EVENTI SOCIALI SERALI</i>	19
ORAL SESSIONS <i>SESSIONI ORALI</i>	21-60
Wednesday / <i>Mercoledì</i>	21-31
Thursday / <i>Giovedì</i>	32-45
Friday / <i>Venerdì</i>	46-60
POSTER AND VIDEO SESSIONS <i>SESSIONI POSTER E VIDEO</i>	61-65
POST SYMPOSIUM TOUR <i>GITA POST SIMPOSIO</i>	66-68
TECHNICAL BOARD OF COMPANIES <i>COMITATO TECNICO AZIENDE</i>	69-74
ORGANISERS <i>ORGANIZZATORI</i>	75-76
OFFICIAL PUBLISHER <i>CASA EDITRICE UFFICIALE</i>	77
PARTNER JOURNAL <i>RIVISTA PARTNER UFFICIALE</i>	78-79
MEDIA PARTNERS <i>MEDIA PARTNER</i>	80

# PRESENTATION

# PRESENTAZIONE

Following the success of the fifth edition held in virtual format in 2020, with 255 delegates from 40 different countries despite the pandemic circumstances, we are pleased to welcome you in person at SUM 2022 / 6th Symposium on Circular Economy and Urban Mining.

Saving and recovery of resources and increasing need of environmental sustainability have been the driving forces for the development of Circular Economy and Urban Mining strategies. These represent a real revolution in waste management as well in several other fields. In order to optimise them, a scientific approach is necessary, involving all the different disciplines (Engineering, Economy, Chemistry, etc.), all possible stakeholders (industries, researchers, waste management companies, citizens, decision makers, administrators, regulators, politicians, etc.) and considering all the implementation aspects including the most critical ones, such as quality of recycled products, sustainable management of residues, symbiosis between producers and recyclers, stability of markets, end of waste regulations, role of final sinks, etc.

The SUM Symposium, organised biennially since 2012 by **IWWG–International Waste Working Group**, nowadays represents the ideal reference Forum for Circular Economy and Urban Mining, where scientists and stakeholders can debate the most advanced results and focus on future needs.

SUM 2022 is held under the patronage of the Italian Ministry for Ecological Transition, Campania Region, City of Capri, ENEA–Italian National Agency for New Technologies, Energy and Sustainable Economic Development, and ISPRA - The Italian Institute for Environmental Protection and Research.

*Dopo il successo della quinta edizione tenutasi online nel 2020, che, nonostante le difficili circostanze dovute al Covid, fu seguita da 255 partecipanti collegati da 40 Paesi, siamo lieti di darvi il benvenuto, finalmente di nuovo in presenza, al SUM 2022 / 6° Simposio sulla Circular Economy e sull'Urban Mining.*

*Il recupero e conseguente risparmio di risorse congiunto all'esigenza di garantire uno sviluppo sostenibile per l'ambiente sono state le forze guida per lo sviluppo delle strategie di Economia Circolare e di Urban Mining. Esse rappresentano una vera rivoluzione nella gestione dei rifiuti che si sta estendendo anche ad altri settori.*

*Per ottimizzare queste strategie è necessario un approccio scientifico che coinvolga tutte le diverse discipline (Ingegneria, Economia, Chimica, ecc.), tutti i possibili stakeholders (industrie, ricercatori, aziende di gestione e di recupero dei rifiuti, cittadinanza, decisori pubblici, amministratori, legislatori, politici, ecc.) e che consideri tutti gli aspetti inclusi quelli più critici che potrebbero rallentare la loro applicazione. Tra questi la qualità dei prodotti riciclati, la gestione sostenibile dei residui non recuperati, la simbiosi tra produttori e riciclatori, la stabilità dei mercati, la regolamentazione dell'End of Waste, il ruolo virtuoso dei sink finali, ecc.*

*Il Simposio SUM sull'Economia Circolare e l'Urban Mining viene organizzato biennialmente dall'IWWG–International Waste Working Group e si svolge ininterrottamente dal 2012. Esso rappresenta uno dei più importanti eventi scientifici internazionali sull'argomento.*

*Il Convegno, promosso da Istituzioni, Enti e Organizzazioni italiani e stranieri di primaria importanza, si avvale del supporto scientifico di alcuni dei più importanti Atenei del mondo e del fattivo contributo all'elaborazione del programma di oltre 75 scienziati, provenienti da 28 diversi Paesi, distribuiti nei cinque continenti e rappresentativi di tutti gli ambiti disciplinari coinvolti nell'Economia Circolare.*

*Il SUM 2022 è patrocinato dal Ministero della Transizione Ecologica, dalla Regione Campania, dalla Città di Capri, dall'Enea Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile e dall'ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale.*

# SCIENTIFIC COMMITTEES

## COMITATI SCIENTIFICI

### SYMPOSIUM CHAIRS / PRESIDENTI DEL SIMPOSIO



**Prof. Raffaello COSSU**  
University of Padova (IT)



**Prof. Johann Fellner**  
TU Wien (AT)



**Prof. Ian Williams**  
University of Southampton (UK)

### Strategic Scientific Committee / Comitato Scientifico Strategico

- Thomas ASTRUP, Denmark University of Technology (DK)
- Andreas BARTL, TU Wien (AT)
- Giuseppe BONIFAZI, Sapienza University of Rome (IT)
- Maria Cristina LAVAGNOLO, University of Padua (IT)
- Francesco PIROZZI, University of Naples "Federico II" (IT)
- Kaimin SHIH, The University of Hong Kong (HK)
- Rainer STEGMANN, Hamburg University of Technology (DE)
- Dongbei YUE, Tsinghua University (CN)

### International Advisory Board / Comitato Scientifico Internazionale

- Ata AKCIL, Süleyman Demirel University (TR)
- Muhammed ALAMGIR, University Grants Commission of Bangladesh (BD)
- Luca ALIBARDI, Cranfield University (UK)
- Marteen BAKKER, TU Delft (NL)
- Damià BARCELO, Catalan Institute for Water Research Foundation (ES)
- Mehmet Sinan BILGILI, Yildiz Technical University (TR)
- Ralf BRÜNING, Dr. Brüning Engineering (DE)
- William CLARKE, The University of Queensland (AU)
- Hervé CORVELLEC, Lund University (SE)
- Francesco DI MAIO, TU Delft (NL)
- Mario GANDINI, Autonomous University of the West (CO)
- Arghya GHOSH, Indian Institute of Technology Guwahati (IN)
- Sadhan Kumar GHOSH, Jadavpur University, Kolkata (IN)
- Apostolos GIANNIS, Technical University of Crete (GR)
- Evangelos GIDARAKOS, Technical University of Crete (GR)

- Jutta GUTBERLET, University of Victoria (CA)
- Melanie HAUPT, REDILO GmbH (CH)
- Pierre HENNEBERT, INERIS - Institut National de l'Environnement Industriel et des Risques (FR)
- Yongping HUANG, Chinese Academy of Sciences (CN)
- Ramzy KAHHAT, Pontificia Universidad Católica del Perú (PE)
- Jae Young KIM, Seoul National University (KR)
- Kerstin KUCHTA, Hamburg University of Technology (DE)
- Jurate KUMPIENE, Luleå University of Technology (SE)
- Anders LAGERKVIST, Luleå University of Technology (SE)
- Jianguo LIU, Tsinghua University (CN)
- Wenjing LU, Tsinghua University (CN)
- Michael NELLES, University of Rostock (DE)
- Abdul-Sattar NIZAMI, Government College University, Lahore (PK)
- Elsa OLIVETTI, MIT - Massachusetts Institute of Technology (US)
- Mohamed OSMANI, Loughborough University (UK)
- Jan SLAVIK, Jan Evangelista Purkyne University (CZ)
- Natalia SLIUSAR, Perm National Research Polytechnic University (RU)
- Michal ŠYC, Institute of Chemical Process Fundamentals of the CAS (CZ)
- Susan THORNELOE, US Environmental Protection Agency (US)
- Cristina TROIS, University of Kwa-Zulu Natal (ZA)
- Julia VOGEL, Umweltbundesamt - German Environment Agency (DE)
- Kohei WATANABE, Teikyo University (JP)
- Jonathan WONG, Hong Kong Baptist University (HK)
- Lucia Helena XAVIER, Centre for Mineral Technology - CETEM (BR)
- Hideki YOSHIDA, Muroran Institute of Technology (JP)
- Hua ZHANG, Tongji University (CN)

## National Advisory Board / Comitato Scientifico Nazionale

- Vincenzo BELGIORNO, Università degli Studi di Salerno
- Enrico BERNARDO, Università degli Studi di Padova
- Alessandra BONOLI, Università degli Studi di Bologna
- Claudia BRUNORI, ENEA
- Antonio CIANCIULLO, Huffington Post
- Giovanni DE FEO, Università degli Studi di Salerno
- Adriana DEL BORGHI, Università degli Studi di Genova
- Eleonora DI MARIA, Università degli Studi di Padova
- Flora FALESCHINI, Università degli Studi di Padova
- Francesco FATONE, Università Politecnica delle Marche

# SCIENTIFIC COMMITTEES

## COMITATI SCIENTIFICI

- Margherita FERRANTE, Università degli Studi di Catania
- Marco FREY, Scuola Superiore Sant'Anna - Pisa
- Silvia GROSS, Università degli Studi di Padova
- Mario GROSSO, Politecnico di Milano
- Giancarlo LONGHI, Smart City Group
- Carmine LUBRITTO, Università degli Studi della Campania "Luigi Vanvitelli"
- Antonella LUCIANO, ENEA
- Giuseppe MANCINI, Università degli Studi di Catania
- Alessandro MARANGONI, Althesys
- Salvatore MASI, Università degli Studi della Basilicata
- Aldo MUNTONI, Università degli Studi di Cagliari
- Federico PERES, Butti and Partners
- Alberto PIVATO, Università degli Studi di Padova
- Alessandra POLETTINI, Università degli Studi di Roma "La Sapienza"
- Marco RAGAZZI, Università degli Studi di Trento
- Silvia SERRANTI, Università degli Studi di Roma "La Sapienza"
- Giuseppe TIPALDO, Università degli Studi di Torino
- Paolo VIOTTI, Università degli Studi di Roma "La Sapienza"
- Maria Chiara ZANETTI, Politecnico di Torino



# ORGANISING SECRETARIAT

## SEGRETERIA ORGANIZZATIVA



**Gioia BURGELLO**  
Symposium Manager  
*Euowaste Srl*



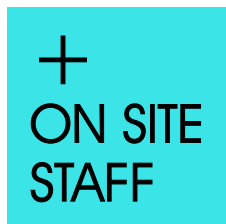
**Elena COSSU**  
General Manager  
*Euowaste + Arcoplan*



**Francesca FAVA**  
Administration  
*Euowaste Srl*



**Anna ARTUSO**  
Graphics & website  
*Arcoplan*



**Giacomo GALINARO**  
Conference Hall  
*University of Padova*



**Angelica LONGHI**  
Conference Hall  
*University of Padova*



**Cristina RAGAZZI**  
Conference Hall  
*University of Padova*

---

SUM 2022 Organising Secretariat:  
Euowaste Srl / Via Beato Pellegrino 23, Padova, Italy / tel. + 39 049 8726986  
info@euowaste.it / www.euowaste.it / www.sumsymposium.it

# SYMPOSIUM STRUCTURE

## STRUTTURA SIMPOSIO

The scientific programme of SUM 2022 includes more than 190 presentations selected by the Symposium Committees.

The presentations have been organized in Oral sessions, Workshops, Poster and video sessions. Oral sessions last 60 min and include 4 presentations (40min) and a Discussion. Workshops are focused on controversial issues in Circular Economy; they include few introductory short papers for seeding the debate among participants.

In addition to these traditional sessions, the Symposium includes **five plenary Focus sessions**, to be held everyday, one in the morning and one in the afternoon, dedicated to specific Themes of high public interest. A moderator, after a state of the art presentation and statement made by 2-3 experts in the field, will guide the discussion among the experts and the audience. The format and the session settings will be similar to a “talk show”.

All the presentations are in English. **A service of simultaneous translation into Italian is provided in Session A, opening session and Focus sessions.**

**Posters** are accessible to Symposium delegates at all times in digital format. Three designated computers are always available in the foyer of the Congress Centre to browse through all posters (PDF files) and watch the pre-recorded presentations by their authors.

These materials are available also on the Symposium virtual platform and mobile app (pagg. 17-18). Delegates are able to send questions to the authors via chat, Q&A or video call through the virtual platform.

The symposium programme includes also nine **video presentations**. This virtual-only session includes pre-recorded video presentations by Authors who cannot attend in person. Their videos are available on our virtual platform, where attendees will be able to send their questions and contact the Authors via chat or video calls.

*Il programma scientifico del SUM 2022 comprende più di 190 presentazioni selezionate dai Comitati Scientifici del Simposio.*

*Le presentazioni sono state organizzate in sessioni orali, workshop, poster e video. Le sessioni orali durano 60 minuti e includono 4 presentazioni (40 minuti) seguite da un momento di discussione con il pubblico. I workshop sono incentrati su temi controversi dell'Economia Circolare; includono alcune brevi letture introduttive per aprire il dibattito tra i partecipanti.*

*Oltre alle sessioni tradizionali, il Simposio prevede **cinque momenti di confronto in seduta plenaria**, le Focus Session, dedicate a temi specifici di alto interesse pubblico, che si terranno tutti i giorni, una al mattino e una al pomeriggio. Un moderatore, dopo una presentazione sullo stato dell'arte e un'introduzione da 2-3 esperti del settore, guiderà la discussione tra gli esperti e il pubblico. Il formato e le impostazioni della sessione saranno simili a un “talk show”.*

*Tutte le presentazioni sono in lingua inglese. **E' previsto un servizio di traduzione simultanea in tutte le sessioni A, nella sessione di apertura e in tutte le sessioni Focus.***

La sessione Poster sarà accessibile digitalmente per l'intera durata del Simposio, attraverso la piattaforma virtuale e la app del Simposio (vedi pagg. 17-18). Tre postazioni pc sono sempre disponibili nel foyer del Centro Congressi per visualizzare tutti i poster in PDF, guardare le presentazioni pre-registrate degli autori e inviare le proprie domande tramite la sezione Q&A e la chat.

E' inoltre possibile contattare direttamente gli autori per incontrarsi di persona o virtualmente e approfondire la discussione del poster.

Il programma prevede anche 9 video presentazioni. La **Sessione Video** include interventi pre-registrati degli autori impossibilitati a partecipare in presenza. Tale sessione è disponibile solo online sulla nostra piattaforma virtuale. E' inoltre possibile inviare domande agli autori attraverso la sezione Q&A, la chat o tramite videochiamata.

## CONFERENCE HALLS / SALE CONGRESSUALI

SUM 2022 will be held in the Municipal Congress Centre of Capri. The congress centre consists of three fully-equipped meeting rooms. Furthermore, a fourth meeting room is located in the Hotel Syrene, just a few steps away from the congress centre, specifically in Via Camerelle 51.

Il SUM 2022 si tiene all'interno del Centro Convegni Comunale della Città di Capri. E' dotato di tre sale congressuali. Un' ulteriore sala è ubicata presso l'Hotel Syrene, a pochi passi dal Centro Congressi, in Via Camerelle 51.

- Session A: Municipal Congress Center, Cinema Hall - ground floor
- Session B: Municipal Congress Center, Pollio Hall - first floor
- Session C: Hotel Syrene - Via Camerelle 51, Capri
- Session D: Municipal Congress Center, Glass Room - first floor

# INSTRUCTIONS

# ISTRUZIONI

## INSTRUCTIONS FOR SESSION CHAIRS & SPEAKERS / ISTRUZIONI PER PRESIDENTI DI SESSIONE E RELATORI

### Instructions for Chairs of Sessions

On arrival at the Symposium venue Chairs of oral sessions and workshops are kindly requested to contact the Speakers' Desk where curricula vitae of speakers will be provided and any last-minute changes in the programme of the session to be chaired will be notified.

Fifteen minutes prior to the start of the sessions, Chairs should report to the conference room where the session will take place, to meet the speakers.

Chairs are furthermore requested to ensure that all speakers remain seated at the table throughout the entire session and that the timetable is strictly adhered to. This aspect is of extreme importance in order to allow delegates to schedule their attendance in the parallel sessions.

### Istruzioni per i Presidenti di sessione

*I Presidenti delle sessioni orali e dei workshop sono gentilmente pregati di avvicinarsi allo Speakers Desk al proprio arrivo presso la sede del Simposio affinché vengano forniti loro i curricula vitae dei relatori e vengano comunicate eventuali modifiche al programma della sessione che dovranno presiedere.*

*Quindici minuti prima dell'inizio delle rispettive sessioni, i Presidenti si presenteranno presso la sala dove si svolgerà la sessione per prendere contatto con i relatori.*

*I Presidenti di sessione sono inoltre pregati di adoperarsi affinché nessuno dei relatori abbandoni la sala prima della conclusione della sessione e venga rispettata la tempistica prevista. Quest'ultimo aspetto è di particolare importanza al fine di consentire ai partecipanti di seguire le relazioni di loro interesse in diverse sessioni parallele.*

### Information for Speakers

Speakers should contact the Chair 15 minutes prior to the start of the session in which their paper is to be presented. The Chair will be available in the conference room where the session is to take place. Speakers should be present at the conference table from the beginning of the session and remain for the entire duration. During the presentation commercial advertising should be avoided. Mention of affiliations or company name should be very discreet.

A member of our staff is on hand at the Speakers' Desk for all requirements. Speakers who have not sent a copy of their PowerPoint presentation to the Organising Secretariat are kindly requested to contact the Speakers' Desk in a timely manner, at the latest within the session prior to the one in which their own presentation is scheduled.

If your allotted time runs out, do not under any circumstances hurry to finish the entire presentation but go straight to the conclusions. To this regard, it may be of use to prepare a slide illustrating the conclusions in a synthesized version.

# INSTRUCTIONS

## ISTRUZIONI

### **Informazioni per i relatori**

*I relatori dovranno contattare il Presidente della sessione durante la quale presenteranno la propria relazione almeno 15 minuti prima dell'inizio della stessa nella sala conferenze di riferimento. Gli autori dovranno essere presenti al tavolo della conferenza dall'inizio della sessione e rimanervi per tutta la durata della stessa. Nella presentazione va assolutamente evitata qualsiasi forma di pubblicità. Il riferimento a enti o ditte di appartenenza deve essere molto discreto. Al Banco Relatori sarà sempre presente un incaricato dell'organizzazione per fornire eventuale assistenza. Non sarà possibile utilizzare il computer del banco relatori per preparare le relazioni, ma solo per apportare piccole modifiche e per un controllo finale.*

*I relatori che non avessero inviato una copia della loro presentazione PowerPoint alla Segreteria Organizzativa prima del Simposio sono cortesemente pregati di recarsi al Banco Relatori non oltre la sessione precedente a quella in cui devono presentare la propria relazione (se si tratta di una sessione in programma per la mattina, il termine ultimo per contattare il Banco Relatori sarà la sera prima).*

*I relatori dovranno assicurarsi che la presentazione sia consegnata allo staff di riferimento secondo le tempistiche indicate.*

*Durante la presentazione, nel caso stia per terminare il tempo a disposizione, si prega di non accelerare per esporre il resto della relazione ma di passare direttamente alle conclusioni. A tal proposito, potrebbe rivelarsi utile preparare una slide che sintetizzi le conclusioni.*

# USEFUL INFORMATION

## INFORMAZIONI UTILI

### WHAT'S INCLUDED IN YOUR REGISTRATION / CHE COSA È INCLUSO NELLA VOSTRA REGISTRAZIONE

- Access to all Symposium sessions and workshops
- Coffee breaks
- Conference Proceedings (USB pendrive)
- Conference material
- Symposium App
- 50% discount on Gala Dinner cost
- On-demand complete videos in the weeks following the event
- Members Area

- *Accesso a tutte le sessioni del Simposio*
- *Coffee break*
- *Atti del Simposio su chiavetta USB*
- *Materiale congressuale*
- *App del Simposio*
- *50% di sconto sulla cena di Gala*
- *Accesso on-demand alle registrazioni delle sessioni dopo l'evento*
- *Accesso alla members area*

### REGISTRATION / REGISTRAZIONI

The Registration Desk will be open in the Conference Centre with the following schedule:

- Wednesday May 18th: 8:30 - 9:00, 11:00 - 13:00 / 15:00 - 18:30
- Thursday May 19th: 8:30 - 13:00 / 15:00 - 18:30
- Friday May 20th: 8:30 - 13:00 / 15:00 - 18:30

*Il banco segreteria per la registrazione al Simposio sarà aperto presso la reception del Centro Congressi ai seguenti orari:*

- *Mercoledì 18 maggio: 8:30 - 9:00, 11:00 - 13:00 / 15:00 - 18:30*
- *Giovedì 19 maggio: 8:30 - 13:00 / 15:00 - 18:30*
- *Venerdì 20 maggio: 8:30 - 13:00 / 15:00 - 18:30*

# VIRTUAL PLATFORM & APP

## PIATTAFORMA VIRTUALE & APP

Our virtual platform and mobile app, powered by Whova, will allow participants to watch all conference sessions from wherever they are in the world and interact with on-site speakers and delegates.

The platform will be accessible from any device (phones, tablets and computers) and will keep you updated on all conference activities and news.

All delegates will be able to:

- view the agenda, explore sessions and build their personal schedule
- watch all presentations in live streaming
- join live discussions and Q&A chats
- read speakers' profiles and download their conference papers
- network with other attendees via chat and video calls
- share photos and posts on the social wall
- view info and profile of Companies
- browse through all posters and watch the discussions by their authors
- rewatch every session on demand after the conference!

### **The app will be our main tool to communicate with you!**

Please download it now and check it out!

*La piattaforma virtuale e la app ufficiale del Simposio, sviluppata da Whova, consentirà a tutti i delegati di seguire tutte le sessioni ovunque si trovino e interagire con gli altri partecipanti sia in presenza che online.*

*La piattaforma sarà disponibile per tutti i dispositivi (smartphone, tablet e computer) e vi terrà aggiornati su tutte le attività del SUM 2022 (programma scientifico, eventi sociali, ultime notizie, ecc.).*

*Attraverso la app e la piattaforma, i delegati potranno:*

- leggere tutto il programma ed esplorare le sessioni
- creare il proprio programma personalizzato
- guardare le sessioni in diretta
- partecipare alle discussioni e inviare domande ai relatori
- leggere i profili e i CV degli speaker e scaricare gli articoli presentati al SUM
- fare network con gli altri partecipanti tramite messaggi privati, video call o chat di gruppo
- condividere foto e post sulla bacheca
- leggere i profili delle Imprese del Comitato Tecnico del SUM
- ricevere aggiornamenti di programma e ultime notizie in tempo reale
- riguardare tutte le sessioni registrate dopo la fine del Simposio

### **La App sarà il nostro strumento principale per comunicare con voi!**

*Si prega di scaricarla subito e di tenerla costantemente monitorata!*



## INSTRUCTIONS FOR DOWNLOAD

### Mobile app (for smartphones and tablets)

The mobile app is available in the App Store and Google Play Store:

- Download the Whova app
- Sign up with the same email address you used for registering in the Symposium
- Click on the event SUM 2022

### Desktop version (for computers)

The virtual platform is accessible at:

**[https://whova.com/portal/webapp/sceau\\_202205/](https://whova.com/portal/webapp/sceau_202205/)**

To enter the Symposium, log in or click "Sign up here" to create a new profile with your email address.

Please make sure to use the same email address you used when registering for the Symposium and you will automatically log in to the event page.

## ISTRUZIONI PER IL DOWNLOAD

*La app è disponibile su App Store e Google Play Store:*

- Scarica Whova
- Registrati con lo stesso indirizzo email fornito in fase di registrazione al Simposio
- Clicca sull'evento SUM 2022

### Versione Computer (PC e notebook)

*La piattaforma virtuale è accessibile da computer al seguente link:*

**[https://whova.com/portal/webapp/sceau\\_202205/](https://whova.com/portal/webapp/sceau_202205/)**

*Per accedere al Simposio, si prega di effettuare il log in o creare un nuovo profilo con lo stesso indirizzo email fornito in fase di registrazione al Simposio.*

## MEMBERS' AREA / AREA RISERVATA

All accepted papers are available for download (PDF documents) from the website members' area (available upon login to registered participants only).

*Tutti i paper accettati sono disponibili per il download (file PDF) nell'area riservata del sito ufficiale del Simposio (accesso con login solo per i partecipanti).*



# SOCIAL PROGRAMME

## EVENTI SOCIALI E SERALI

Social events have always played a crucial role in the success of our Symposia, representing the chance for all delegates to enjoy the company of colleagues and friends and relax after a full day of conference sessions. SUM Symposium will be the perfect occasion to meet again after a long time, create new collaborations and friendships, share ideas and have a good time together!

For further details please check the bulletin board in the congress foyer or contact the organising secretariat at the registration desk!

*Come tutti sappiamo, negli ultimi tempi abbiamo dovuto ridurre al minimo le interazioni sociali e le attività di gruppo. Il SUM2022 sarà l'occasione perfetta per ritrovarsi dopo tanto tempo, creare nuove collaborazioni e amicizie, condividere idee e divertirsi insieme!*

*Per ulteriori dettagli sui singoli eventi serali contattare la segreteria organizzativa al banco registrazioni o consultare la bacheca nel centro congressi*



### Thursday / 19 May / h. 22:00 LIVE MUSIC & DANCING NIGHT

The Taverna Anema e Core is the most famous night club on the island, a must for those who want to fully immerse in the best and authentic Caprese fun! **Buy your ticket!** Page 46



### Friday / 20 May / h. 20:30 CLOSING GALA DINNER

As per tradition, to celebrate the closure of the conference, all delegates are invited to a formal dinner at the restaurant Al Capri, just a few steps away from the Piazzetta, with a spectacular panoramic view. **Book your seat!** Page 60



### Saturday / 21 May / h. 10:00 - 14:00 CAPRI BOAT TOUR

Join us in a boat tour around the island aboard a typical gozzo. During the tour, we will have the unmissable opportunity to admire the Faraglioni and the famous Blue Grotto. Don't forget your bathing suit! **Book your place.** Page 66



DAY 1 / WEDNESDAY  
MAY 18



# MONDAY MAY 21

## MORNING

9:00-11:00 / CINEMA HALL / TRANSLATION ENG-ITA

### OPENING SESSION

Chair / *Presidente*: Raffaello Cossu (IT)

### WELCOME ADDRESSES / *SALUTI DI BENVENUTO*

#### 9:00-10:30

- Raffaello Cossu, *University of Padova (IT)*
- Marino Lembo, *Mayor of Capri (IT)*
- Paolo Russo, *Chamber of Deputies, Italian Parliament (IT)*
- Fulvio Bonavitacola, *Regional Councilor, Environment Department, Campania Region (IT)*
- Paola Migliorini, *Directorate-General for Environment (ENV), European Commission (EU)*
- Claudia Brunori, *ENEA - Italian National Agency for New Technologies, Energy and Sustainable Economic Development (IT)*
- Giovanni Esposito, *University of Naples "Federico II" (IT)*
- Johann Fellner, *Technical University of Wien (AT)*
- Ian Williams, *University of Southampton (UK)*
- Evangelos Gidarakos, *President of IWWG - International Waste Working Group, Technical University of Crete (GR)*

### OPENING LECTURES / *RELAZIONI DI APERTURA*

#### 10:00-10:30

*R. Cossu, J. Fellner, R. Stegmann, I. Williams*

"Present and future of Circular Economy and Urban Mining"

---

COFFEE BREAK / 11:00 -11:30

# WEDNESDAY MAY 18

## MORNING

### SESSION A1 / 11:30-12:30 / CINEMA HALL / TRANSLATION ENG-ITA

#### STRATEGIES AND POLICIES

Chair / *Presidente*: Claudia Brunori (IT)

*O. Johansson (SE)*

Did End of Waste bring the End of Waste?

*C. Dalhammar, L. Milios (SE)*

The evolving European policy mix for longer product lifetimes: implications for policymakers and corporations

*A. Luciano, L. Cutaia, F. Cioffi, C. Sinibadi (IT)*

A multi-user platform to enhance the use of recycled products in public works

*T. Siderius, T. Zink (US)*

Markets and the future of the Circular Economy

*R. Ruan, L. Dai, D. Mataya, J. Chen, K. Cobb, N. Zhou, R. Zhang, L. Wang, Y. Cheng, M. Addy, P. Chen, H. Lei (US)*

Complete solid and liquid waste utilization for circular economy development

### SESSION B1 / 11:30-12:30 / POLLIO HALL

#### C&D WASTE MANAGEMENT

Chair / *Presidente*: Jakob Lederer (AT)

*O. Trotta, G. Bonifazi, G. Capobianco, S. Serranti (IT)*

Detection of asbestos in post-earthquake building waste through hyperspectral imaging and micro-X-ray fluorescence

*F. Carollo, F. Ceruti, L. Rigamonti (IT)*

Economic evaluation of the Construction and Demolition waste management chain through the Life Cycle Costing methodology.

*M. Rigillo, S. Russo Ermolli, G. Galluccio, S. Piccirillo, S. Tordo, F. Galdi, M. Musto (IT)*

Digital process for non-standard elements fabrication from C&D materials

*J.D. Cabrera Gómez, P. Velasco Espín (EC)*

Construction and demolition waste in Tungurahua: a case study from Ecuador

---

LUNCH BREAK / 12:30-15:00

SESSION C1 / 11:30-12:30 / HOTEL SYRENE

**WASTE MATERIAL SORTING**

Chair / Presidente: Alberto Pivato (IT)

*D. Blasenbauer, A.-M. Lipp, J. Fellner, J. Lederer (AT)*

Recovery potential of recyclables from mixed MSW applying automatic waste sorting - Preliminary results from a one year investigation into two industrial-scale facilities

*A. Pivato, G. Beggio, P. Hennebert, C. Mensi, M. Sisti, L. Maggi (IT)*

Refining the calculation of the mass of solid waste samples: tentative estimation of the shape factor based on a large number of measurements of particles dimensions

*M. Castro-Díaz, M. Osmani, S. Cavalaro, I. Cacho, I. Uria, P. Needham, J. Thompson, B. Parker, T. Lovato (UK)*

Laboratory scale evaluation of hyperspectral imaging sorting of refurbishment plasterboard waste

*A.-M. Lipp, D. Blasenbauer, J. Lederer (AT)*

Increasing local recycling rates of plastic packaging waste through mechanical sorting of mixed municipal solid waste: a case study from Austria

---

LUNCH BREAK / 12:30-15:00

# WEDNESDAY MAY 18

## AFTERNOON

SESSION A2 / 15:00-16:00 / CINEMA HALL / TRANSLATION ENG-ITA

### TEXTILE WASTE

Chair / *Presidente*: Peter Shaw (UK)

*A. Shtukaturova, M. Šyc, B. Zach, M. Pavlas, R. Šomplák (CZ)*

Material flow analysis of textile waste: A case study of the Czech Republic

*D. Mehanni, E. Boschmeier, F. Quartinello, A. Bartl (AT)*

Evaluation of recycling fibres from blend materials via enzymatic hydrolysis

*F. Quartinello, G. M. Guebitz (AT)*

Biotechnological approaches for textile waste recycling

*P. Kählig, W. Ipsmiller, A. Bartl (AT)*

Alkaline and enzymatic hydrolysis of different PET / cotton blends from textile waste

SESSION B2 / 15:00-16:00 / POLLIO HALL

### TECHNICAL RECOVERY OF RESOURCES FROM WASTEWATER

Chair / *Presidente*: Maria Pettersson (SE)

*V. Grossule, R. Cossu, M.C. Lavagnolo (IT)*

Wastewater treatment using Black Soldier Fly larvae: effect of organic content quality on treatment and on resource recovery from biomass

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

Economy of nutrient and particulate recovery versus structural treatment of urban drainage

*L. Thumeyer, P. Fröhlich, S. Pavón, M. Bertau (DE)*

Recovery of ammonia in the calcination of struvite

*R. Pulcher, N. Greggio, C. Carlini, E. Dinelli, A. Buscaroli (IT)*

Functionalization of carbon-based materials for Critical Raw Materials (CRMs) removal from aqueous solution

---

COFFEE BREAK / 16:00 -16:30



## SESSION C2 / 15:00-16:00 / HOTEL SYRENE

### METAL RECOVERY

Chair / *Presidente*: Dominik Blasenbauer (AT)

*S. Dworak, J. Fellner (AT)*

Past and future of steel scrap – A detailed analysis of the European scrap arisings and its quality

*L. Ciacci, C. T. de Matos, B. K. Reck, D. Wittmer, E. Bernardi, F. Mathieux, F. Passarini (IT)*

Material system analysis of manganese, nickel and natural graphite in the EU

*J.H. Potgieter, S. Teimouri (ZA)*

A preliminary feasibility investigation into a novel method for leaching vanadium from waste vanadium slag using ionic liquids

*M. La Monica, L. Cutaia, P. Altamura, V. Squicciarino (IT)*

Valuing metal waste produced by micro and small enterprises in the electrical, plumbing and other installation activities for construction: a study on the potentiality in the Metropolitan City of Rome Capital

## SESSION D2 / 15:00-16:00 / GLASS ROOM

### WORKSHOP: REGENERATIS - DEVELOPING THE METHODOLOGY FOR RECOVERING RAW MATERIALS

Chair / *Presidente*: Stuart Wagland (UK)

This workshop will present the REGENERATIS work completed to date, including the data collected from historical studies, the 3x pilot sites and the methodology planned for the SMARTIX tool development. The aim of the workshop will be to discuss the approach taken so far and to assess any additional information the project team can include from attendees. The recovery methods and approaches will be analysed with input from workshop delegates, with the key technical, environmental and economical considerations explored.

#### Introductory lectures:

*S. Wagland (UK)*

Overview of REGENERATIS project

*F. Coulon (UK)*

Historical databases

*I. Isunza Manrique, F. Coulon (BE)*

Pilot site investigations

*S. Wagland (UK)*

REGENERATIS methodology

---

## COFFEE BREAK / 16:00 -16:30

# WEDNESDAY MAY 18

## AFTERNOON

### FOCUS SESSION I

CINEMA HALL / 16:30-17:20

#### RECYCLING OF FAST FASHION (TEXTILE) AND BEAUTY WASTE / RICIRCOLO DEI RIFIUTI TESSILI (MODA USA E GETTA) E DEI RIFIUTI DELLA CURA DEL CORPO

*In this session a service of simultaneous translation English - Italian will be provided*

Textile production has increased steadily of the last decades. The volume of fibers, the major constituent of textiles has increased from 22 million t in 1970 to 101 million in 2020 (this corresponds to a fivefold increase).

The growth is even more remarkable when considering synthetic polymer fibers, which have grown from 5 to 70 million t in the same period (this corresponds to a fourteen-fold increase). Despite these considerable quantities, textiles were not given any attention in the EU. Recycling processes are completely underdeveloped and business models such as fast fashion fuel fiber consumption. With the amendment of the Waste Framework Directive in 2018, textiles have come into focus and massive changes are expected in the coming years. Efficient collection systems have to be established and recycling schemes have to be developed and put into operation. But not only technical solutions will be necessary, through economic measures and increasing consumer awareness the consumption of textiles has to be reduced. Clothing should continue to be a playground for creatives and designers, but the pathological overconsumption must be stopped.

*La produzione tessile è incrementata costantemente nel corso degli ultimi decenni. Il volume di fibre, principale costituente tessile, da 22 milioni di tonnellate del 1970, nel 2020 ha raggiunto i 101 milioni (che corrisponde a un aumento pari a cinque volte la quantità iniziale). La crescita è ancora più evidente se si considerano le fibre sintetiche polimeriche, che nell'arco dello stesso periodo hanno raggiunto, partendo da 5 milioni di tonnellate, i 70 milioni (crescita pari a 14 volte).*

*Nonostante le notevoli quantità, ai tessili non è stata riservata alcuna attenzione dall'UE. I processi di riciclaggio sono particolarmente arretrati e i modelli di business come il fast fashion alimentano il consumo di fibre. Con l'emendamento del Waste Framework Directive del 2018, i tessili hanno guadagnato maggiore attenzione e ci si aspettano cambiamenti significativi nel corso degli anni a venire. Dovranno essere adottati sistemi di raccolta efficienti e verranno sviluppati schemi di riciclo da implementare.*

*Ma non saranno necessarie soltanto soluzioni tecniche, infatti il consumo dovrà essere ridotto tramite misure economiche e una maggiore consapevolezza dei consumatori. Il settore tessile dovrebbe continuare a rappresentare uno strumento per creativi e designer, tuttavia è da interrompere il sovraconsumo patologico.*



**Moderator:**

**Valerie Rapatz, TU Wien (AT)**

She has a master of Science in Supply Chain Management at Wirtschaftsuniversität Wien. She is currently working for Fraunhofer Austria in the department of Logistics and Supply Chain Management, focusing on digital logistics and automation as well as supply network design. She is also a Project Assistant at the Technische Universität Wien.

---



**Panelists:**

**Prof. Andreas Bartl**

*TU Wien (AT)*



**Prof. Peter Shaw**

*University of Southampton (UK)*

# WEDNESDAY MAY 18

## AFTERNOON

### SESSION A3 / 17:30 -18:30 / CINEMA HALL / TRANSLATION ENG-ITA

#### MANAGEMENT OF PLASTIC WASTE

Chair / *Presidente*:

*C.A. Fletcher (UK)*

Implications of consumer confusion, unrealistic expectations, and the value-action gap on the use and disposal of bioplastics

*E. Gidarakos (GR)*

Management of plastics waste from Covid pandemic

*L. Grabuschnig, H. Rechberger (AT)*

Production, consumption and waste management of plastics in Austria - A comprehensive analysis of national plastic flows

*M. Arnold (FI)*

Forecasting the generation of plastic packaging waste until 2030. Case Finland

### SESSION B3 / 17:30 -18:30 / POLLIO HALL

#### MANAGEMENT OF RESOURCES FROM WASTEWATER

Chair / *Presidente*: Ian Williams (UK)

*M. Pettersson, O. Johansson (SE)*

How cautious should we be? The role of the precautionary principle in the regulation of sewage sludge in Sweden

*G. Campo, A. Cerutti, M. Zanetti, G. Scibilia, M. De Ceglia, B. Ruffino (IT)*

Toward the energy self-sustainability of a WWTPs. Thermophilic Temperature-Phased Anaerobic Digestion (TPAD) as biological pretreatment to increase the WAS anaerobic biodegradability

*R. Cossu (IT)*

End of waste issues in the recovery of fuel from bilge water

*G. Cipolletta, M. Parlapiano, M. Sgroi, A.L. Eusebi, F. Fatone (IT)*

Optimization of brine management towards the zero/minimal liquid discharge approach

## SESSION C3 / 17:30 -18:30 / HOTEL SYRENE

### METAL RECOVERY FROM INDUSTRIAL WASTE

Chair / Presidente: Evangelos Gidarakos (GR)

*I. Isunza Manrique, D. Caterina, M. Dumont, B. Mignon, A. Masse, P. Kessouri, J. C. Gourry, F. Nguyen (BE)*

Characterization of past metallurgical residues using geophysical imaging: a case study of Duferco site (Belgium)

*V.A. Riggio, J. Seccatore, M.C. Zanetti (IT)*

Preliminary study on phytoextraction of heavy metals from copper mining wastes in Chile

*I. Tezyapar, N. Marsay, V. Huntington, F. Coulon, M.C. Alamar, M. Capstick, S. Higson, A. Buchanan, S.T. Wagland (UK)*

Assessing metal recovery opportunities from past metallurgical sites and waste deposits: UK case study

*G. Mancini, F. Palmeri, G. Benina, S. Cacciola, A. Luciano, D. Fino (IT)*

Cost analysis of FCC spent catalyst sustainable use in molybdenum contaminated hazardous wastes stabilization

## SESSION D3 / 17:30 -18:30 / GLASS ROOM

### WORKSHOP: THE ROLE OF MATERIALS FOR CIRCULAR DESIGN OF CONSUMER PRODUCTS

Chair / Presidente: Mateusz Wielopolski (DE)

The sustainability of a product and most of its environmental impact is determined by the material choice already at the initial product design stages. Hence, understanding the material value chains allows product designer not only to define what will happen to the product at the end of its lifecycle but also what is the value of sustainability features for the end user. This interactive workshop will cover the fundamental principles of product design for a circular economy and focus on the impact of material choices on the entire product value chain. The participants will get the chance to explore and test themselves how the perception of sustainability and willingness to pay is driven by the knowledge of material concepts, recyclability and technology expertise.

*M. Wielopolski (DE)*

- Introduction into the fundamental concepts of circular design
- Interactive Mentimeter quiz exercise about sustainable and circular material concepts based on examples from various consumer products

*M. Wielopolski (DE), A. Guerreschi (IT)*

Interpretation of quiz results and correlation with customer awareness studies  
Joint discussion, Q&A



DAY 2 / THURSDAY  
MAY 19

# THURSDAY MAY 19

## MORNING

### SESSION A4 / 9:00 - 10:00 / CINEMA HALL / TRANSLATION ENG-ITA

#### WEEE MANAGEMENT

Chair / *Presidente*: Michal Syc (CZ)

*I. Williams, O.S. Shittu (UK)*

Circular economy thinking to develop sustainable electronic products, business models and designs

*A. Barrera, C. Binet, F. Dubois, P-A. Hebert, P. Supiot, C. Foissac, U. Maschke (FR)*  
Recycling of liquid crystals from E-waste

*R. Bruning, J. Bruning (DE)*

Key findings from a study on the treatment of waste lamps in Germany

*M. Sancllemente Crespo, X. Gabarrell i Durany, L. Talens Peiró (ES)*

Progress in 'Database of Semiconductors and other components' as a public decision support tool for automotive electronics sustainability assessment

*A. Brock, R. Browning, A. Campanie, S. Pal, I.D. Williams (UK)*

Using intergenerational influence and the creative arts to develop public communication methods about e-waste

### SESSION B4 / 9:00 -10:00 / POLLIO HALL

#### TECHNICAL RECOVERY FROM PLASTIC WASTE

Chair / *Presidente*: Diana Ita-Nagy (PE)

*J. Guo, K. Kuchta (DE)*

A compositional analysis of the mixed plastic fraction (DKR-350) from a Lightweight Packaging (LWP) sorting plant: a case study of Northern Germany

*I. Berkane, A. Cabanes, O. Horodytska, I. Aracil, A. Fullana (ES)*

Thermal drying of flexible plastic waste

*V. Santucci, S. Fiore (IT)*

Re-use of waste polyurethane from e-waste

*S.S. Núñez, J. Moltó, J.A. Conesa, A. Fullana (ES)*

PAHs and POPs present in recycled plastic samples

---

COFFEE BREAK / 10:00 -10:30



## SESSION C4 / 9:00 - 10:00 / HOTEL SYRENE

### WORKSHOP: CIRCULAR ECONOMY FOR FOOD

Chair / *Presidente*: Peter Shaw (UK)

This workshop will address the nature and scope of avoidable food waste, with emphasis on how we can apply our understanding of associated problems to seek and identify circular economy solutions. An initial overview presentation will set the context for the workshop; this will outline the food waste problem at global level and with illustrative examples. As an introductory exercise, participants will be asked to indicate their perceptions of food waste in terms of its relative environment, economic, and social impacts, and the balance between these. Working in small groups, participants will be tasked to:

- Share their own reasons for how they perceive the relative importance of impacts of food waste in environmental, economic and social terms;
- Discuss if and how circular economy actions might be taken to ameliorate the impacts as identified;
- Share the outcomes of small group discussions in a plenary session involving all participants.

## SESSION D4 / 9:00 - 10:00 / GLASS ROOM

### WORKSHOP: SUSTAINABILITY OF THERMOSET MATERIALS

Chair / *Presidente*: Julio Vidal (ES)

The workshop will expose the different approaches that are being followed for the treatment of thermosets at their end of life currently, while providing the new solutions that are being explored to optimize the maximum value that can be obtained from the thermoset materials and avoid downgrading. The idea of the workshop is to show the technological advancements and the current TRL of the technologies that are being developed in the field of thermoset waste management and recovery of raw materials.

*J. Vidal (ES)*: Introduction of the topic and current recycling technologies

*Iván Monzón (ES)*: Introduction of robotic technology for the yield optimization in the mechanical treatment of thermosets with high value

*M.C. Royo, R. Garcia (ES)*: Chemical approximation for the recycling process for current and future thermoset materials

*M. Alcalde (ES)*: Biological and enzymatic approach towards the recyclability of composites

*J. Vidal (ES)*: Future of the composites recycling technologies from the industrial perspective

Round table for question and answers about the possibilities and applications of the different technologies in the industry.

---

## COFFEE BREAK / 10:00 -10:30

# THURSDAY MAY 19

## MORNING

### FOCUS SESSION II

CINEMA HALL / 10:30-11:20

#### HOW TO IMPLEMENT CIRCULAR ECONOMY STRATEGIES IN TOURISTIC AREAS? COME RAFFORZARE LE STRATEGIE DI RILANCIO DELL'ECONOMIA CIRCOLARE NELLE AREE TURISTICHE

*This session is in Italian language. A service of simultaneous translation into English will be provided*

The pandemic slowed the process, but the growth in tourist flows represents an important environmental impact factor. How to govern it? How to allow a growth in benefits (psychophysical rebalancing, increase in environmental, artistic, human knowledge) and a decrease in costs (pollution, consumption of materials, greenhouse emissions)?

We need to build travel circuits and brands that guarantee the offer of tourism proposals with a low environmental impact and a high rate of renewability in the field of materials and energy. The options are varied.

They range from strengthening the exploration of neighboring territories by shortening the range of travel to the use of transport systems with low environmental impact. From farms that offer self-produced food to hospitality points that are committed to recycling and reusing objects. From the enhancement of ancient abandoned villages recovered using natural materials to structures that use clean energy.

*La parentesi della pandemia ha rallentato il processo, ma la crescita dei flussi turistici rappresenta un importante fattore d'impatto ambientale. Come governarlo? Come permettere una crescita dei vantaggi (riequilibrio psicofisico, aumento delle conoscenze ambientali, artistiche, umane) e una decrescita dei costi (inquinamento, consumo di materiali, emissioni serra)?*

*Si tratta di costruire circuiti di viaggio e brand che garantiscano l'offerta di proposte turistiche a basso impatto ambientale e ad alto tasso di rinnovabilità nel campo dei materiali e dell'energia.*

*Le opzioni in campo sono varie. Si va dal rafforzare l'esplorazione dei territori vicini accorciando il raggio degli spostamenti all'uso di sistemi di trasporto a basso impatto ambientale. Dalle fattorie che offrono cibo autoprodotta ai punti di ospitalità che s'impegnano sul riciclo e sul riuso degli oggetti. Dalla valorizzazione di antichi borghi abbandonati e recuperati utilizzando materiali naturali a strutture che utilizzano energia pulita.*



**Moderator:**

**Dott. Antonio Cianciullo**, *Huffington Post (IT)*

Journalist and writer, he has followed environmental issues for "la Repubblica" for over 30 years. He participates in major international events: from the great environmental disasters to the conferences of indigenous peoples, from the Earth Summit in Rio de Janeiro in 1992 to the conference in Paris on the climate of 2015.

He is currently in charge of "Terra", the Huffington Post's environmental channel. He graduated in philosophy.

---



**Panelists:**

**On. Mara Carfagna**

*Minister for Southern Italy and Territorial Cohesion  
Presidency of the Council of Ministers (IT)*



**Marino Lembo**

*Mayor of Capri (IT)*



**Prof. Evangelos Gidarakos**

*Technical University of Crete (GR)*



**Prof. Giovanni De Feo**

*University of Salerno (IT)*

# THURSDAY MAY 19

## MORNING

### SESSION A5 / 11:30 - 12:30 / CINEMA HALL / TRANSLATION ENG-ITA PLASTICS AND BIODEGRADATION

Chair / *Presidente*: Johann Fellner (AT)

*M.C. Lavagnolo, V. Poli, A.M. Zampini (IT)*

Facts or myth: biodegradability of biodegradable bioplastics in different ecosystems

*G.M. Guebitz, F. Quartinello, D. Ribitsch (AT)*

Enzyme based recycling processes

*K. Kremser, P. Gerl, A. Pellis, G.M. Guebitz (AT)*

Bacterial sulfuric acid production for bio-recycling of plastic and aluminium from multilayer packaging waste

*F. Fabbri, F. A. Bertolini, G. M. Guebitz, A. Pellis (AT)*

Bio-based building blocks for enzymatic synthesis of polyesters: a Design of Experiments (DoE) study

### SESSION B5 / 11:30 - 12:30 / POLLIO HALL

#### CIRCULAR ECONOMY IN DEVELOPING COUNTRIES

Chair / *Presidente*: Valentina Grossule (IT)

*R.D. Lee, D. Blasenbauer, R. Weber, J. Lederer J. Fellner (AT)*

A practitioner's toolkit for devising integrated solid waste management plans

*F.C. Ballesteros, L. de Sales, R. Pahunang, R.C. Camaclang III, J.C.L. Tembresa, L.N.C. Sanchez (PH)*

Supporting a circular economy through E-waste management: formalizing the informal in global south countries

*C.M. Nell, C.J. Schenck (ZA)*

Cross-case analysis of four household waste characterisation studies in South Africa

*J. Gutberlet, T. Bramryd (CA)*

Social, environmental and climate implications of waste management: waste-to-energy and recycling in a global South context

---

LUNCH BREAK / 12:30-15:00

## SESSION C5 / 11:30 - 12:30 / HOTEL SYRENE

### WORKSHOP: CIRCULAR CONSTRUCTIONS IN REGENERATIVE CITIES

Chairs / *Presidenti*: Kerstin Kuchta, Marco Abis (DE)

The development of large and attractive metropolitan regions needs to be supported by the sustainable growth of their built environment. On one hand this means that future building stock must be adaptive, environmentally compatible and regenerative. On the other hand, existing building stock must be preserved as long as possible through refurbishment and transformation activities, and the embedded materials must be promptly identified to enable their reuse in new structures (...). The aim of this workshop is to discuss the advancements in the development of circular and regenerative cities and to present the progresses achieved so far in CIRCuIT. *Full appetizer available on the website and mobile app*

*K. Kuchta (DE)*: Introduction to the workshop

*A. Bernhardt (DE)*: CIRCuIT - Circular construction in Regenerative Cities

*J. zum Brock (DE)*: Climate protection potential through the use of recycled concrete in Hamburg

*M. Abis (DE)*: Advancements in Pre-Demolition Audit processes

Circular cities road map – Open discussion

## SESSION D5 / 11:30 - 12:30 / GLASS ROOM

### WORKSHOP: OPPORTUNITÀ DI RECUPERO DI RISORSE DAL LANDFILL MINING (ITALIAN SESSION)

Chair / *Presidente*: Raffaello Cossu (IT)

Il Landfill Mining, cioè lo scavo dei rifiuti depositati nelle vecchie discariche, può essere fatto per diversi motivi (ambientali, territoriali, paesaggistici, etc.) ai quali può convenientemente abbinarsi il recupero di risorse, materiali ed energetiche. Nel workshop si discuterà delle possibili opzioni tecniche, delle effettive possibilità di recupero e della fattibilità economica.

#### Partecipano:

Prof. Enrico Bernardo, *Università di Padova*

Dott.ssa Silvia Paparella, *RemTech Expo Hub Tecnologico e Ambientale*

Gen. Giuseppe Vadalà, *Commissario Unico per la bonifica delle discariche, Presidenza del Consiglio dei Ministri*

Magg. Aldo Papoto, *Sub Commissario delle discariche abusive: Casi studio*

#### Relazioni introduttive:

*R. Cossu*: Landfill mining: fattibilità del recupero di risorse

*L. Bellizzi, M. Mercanti, D. Botteri, F. Lombardi, T. Taranta*: Landfill mining in alcune discariche di inerti della Lombardia - Esperienze in corso

---

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

# THURSDAY MAY 19

## AFTERNOON

### SESSION A6 / 15:00 - 16:00 / CINEMA HALL / TRANSLATION ENG-ITA

#### PACKAGING WASTE

Chair / *Presidente*: Maria Cristina Lavagnolo (IT)

*D. Schuch, J. Lederer, J. Fellner, C. Scharff (AT)*

Performance of separate collection systems for plastic packaging – A regional analysis for Austria

*P. Shaw (UK)*

Identifying plastics used for food and beverage packaging: needs and challenges

*E. Bottani, G. Vignali, R. Montanari (IT)*

Valorization of packaged food waste from retailing: a framework

*I. Berkane, A. Cabanes, O. Horodytska, I. Aracil, A. Fullana (ES)*

Microperforation in the delamination process of multilayer metallized packaging

### SESSION B6 / 15:00 - 16:00 / POLLIO HALL

#### CIRCULAR ECONOMY POLICIES IN DIFFERENT COUNTRIES

Chair / *Presidente*: Jutta Gutberlet (CA)

*K. Haarstad, H.K. French, G. Okkenhaug, O.J. Hanssen, M. Sjøvaag (NO)*

earthresQue- an eight year programme for circular waste management in Norway

*I. Williams (UK)*

A review of recycling in Wales

*T.Y. Chitaka, L. Grobler, A. Lötter, K. Gokul, H. Mostert, J. Petersen, A. Stark, C. Trois, C. Schenck (ZA)*

South Africa's transition to a circular economy: critical perspectives on EPR integration measures

*S. Hossaini, G. McCarney (CA)*

Strategic circular economy considerations to enable Canada's low carbon transition

---

COFFEE BREAK / 16:00 -16:30

## SESSION C6 / 15:00 - 16:00 / HOTEL SYRENE

### WEEE TREATMENT

Chair / *Presidente*: Julia Wolf (DE)

*M. Bruno, S. Fiore (IT)*

Pre-treatments of Lithium Iron Phosphate cathodes for Lithium ion batteries recycling

*L. Nastasi, V. Santucci, M. Bruno, S. Fiore (IT)*

Critical analysis of life cycle assessment studies on Lithium ion batteries

*M. Bruno, F. Biossa, S. Fiore (IT)*

Analysis of waste LCDs' dismantling operations

*Y. Sgrillo Pimassoni, L. H. Yamane, R. Ribeiro Siman (BR)*

Recovery of rare earth elements from WEEE: challenges and research needs

## SESSION D6 / 15:00 - 16:00 / GLASS ROOM

### WORKSHOP: QUALITY CONTROL IN CIRCULAR ECONOMY

Chair / *Presidente*: Carly Fletcher (UK)

Quality is a fundamental issue to be kept under consideration in the different Circular Economy steps:

- Industries should design and manufacture their products from more sustainable materials, limit or avoid the use of toxic chemicals, while reducing the impact of emissions from manufacturing processes.
- Presence of toxic chemicals might accumulate during recycling loops influencing the recycled products quality while influencing negatively the quality of processing emissions
- Liquid and solid residues from Circular Economy should be managed in a way to close the material loops designing sustainable sinks where uncontrolled emissions of contaminants would occur

Experiences and Strategies will be discussed during the workshop.

#### Introductory lectures:

*S. Dworak (AT)*

Recycling rates - the higher the better?

*J. Lederer (AT)*

The relevance of sampling for urban mining and circular economy using the built environment as a case study

---

## COFFEE BREAK / 16:00 -16:30

# THURSDAY MAY 19

## AFTERNOON

### FOCUS SESSION III

CINEMA HALL / 10:30-11:20

OPEN ISSUES IN PLASTIC PRODUCTION AND RECYCLING / **PROBLEMATICA DELLA PRODUZIONE E DEL RICICLAGGIO DELLA PLASTICA**

*In this session a service of simultaneous translation English - Italian will be provided*

The consumption of plastics has increased tremendously during the last decades. Globally, almost 400 million metric tons of plastics are produced annually. As the pace of production has increased, so have the plastic waste generation and the associated challenges.

Despite the manifold advantages of plastics during their use phase, their optimal management at the end of their live cycle is still heavily debated.

In the frame of the proposed session, renowned experts from academia and industry will offer their takes on appropriate plastic waste management.

*Il consumo di plastica è aumentato notevolmente nel corso degli ultimi decenni con una produzione globale che raggiunge annualmente quasi 400 milioni di tonnellate.*

*Con l'accelerazione dei ritmi di produzione, anche la generazione di rifiuti plastici e i conseguenti effetti sono aumentati.*

*Nonostante i numerosi vantaggi che la plastica offre nella fase di utilizzo, la gestione al termine del suo ciclo di vita è tuttora un tema dibattuto.*

*Nella sessione, esperti dal mondo accademico e industriale interverranno esponendo le loro posizioni sulla gestione adeguata dei rifiuti plastici.*





**Moderator:**

**Prof. Johann Fellner, TU Wien (AT)**

Associate Prof. Johann Fellner is working as at the Institute for Water Quality and Resource Management at TU Wien (AT) for more than 20 years. From 2012 to 2020, he has headed the Christian Doppler Laboratory for Anthropogenic Resources, a research centre that developed and applied methods for the prospection, exploration, evaluation and classification of secondary resources in analogy to primary resources. His main research interest besides recovery & classification of secondary resources out of different wastes is in the field of landfilling and waste incineration.

---



**Panelists:**

**Prof. Margherita Ferrante**

*University of Catania (IT)*



**Prof. Kerstin Kuchta**

*TUHH, Hamburg University of Technology (DE)*

# THURSDAY MAY 19

## AFTERNOON

### SESSION A7 / 17:30 - 18:30 / CINEMA HALL / TRANSLATION ENG-ITA

#### CONSUMERS PERCEPTIONS AND EDUCATION

Chair / *Presidente*: Ian Williams (UK)

*G. De Feo (IT)*

Environmental education as a bridge between scientists and non-scientists to remove barriers and prejudices

*A. Guerreschi, M. Wielopolski (IT)*

The importance of knowing what your customers know to drive ecologically and economically effective circular design in sports

*L. Milios, C. Dalhammar (SE)*

Consumer attitudes towards product lifetimes: implications for eco-labelling

*G. De Feo, C. Ferrara, F. Minichini (IT)*

Comparison between perceived and actual environmental sustainability: the case of beverage packaging

### SESSION B7 / 17:30 - 18:30 / POLLIO HALL

#### GLASS AND CERAMIC WASTE RECOVERY

Chair / *Presidente*: Giuseppe Mancini (IT)

*G. Tameni, F. Cammelli, H. Elsayed, F. Stangherlin, E. Bernardo (IT)*

Upcycling of pharmaceutical glass in sustainable construction materials

*A. Karamanov, P. Paunović, A. Kamusheva, E. Ljatifi, E. Karamanova, B. Ranguelov,*

*G. Avdeev, A. Grozdanov, D. Karashanova (BG)*

Nano glass-ceramic by Fe-Ni wastes

*F. Faleschini, M. A. Zanini, V. Ortega-Lopez, R. Bertani, C. Pellegrino (IT)*

Valorization of marble sawdust waste in a circular economy perspective

*N.B. Jordanov, A. Karamanov (BG)*

Synthesis and kinetics of sintering of glass-ceramics in air and argon obtained from industrial waste

## SESSION C7 / 17:30 - 18:30 / HOTEL SYRENE

### WORKSHOP: RECYCLING OF TEXTILES

Chairs / *Presidenti*: Andreas Bartl, Wolfgang Ipsmiller (AT)

First, five research projects (national or EU) will be presented in the form of short presentations (5 minutes). Based on these pitches, questions will be collected from the audience, which will be divided into different topics (technical difficulties, legal framework, economic interests, etc.). Afterwards the participants will be divided into groups (break-out groups) to work out solutions and answers to the questions. After that, the results of each subgroup will be presented to all participants.

In a discussion, the participants can then try to weigh the solutions proposed by the break-out groups against each other and ideally find compromises. The aim is not only to highlight the different interests of the stakeholders, but also to find solutions.

#### Introductory lectures:

*G. Guebitz (AT)*

The Resyntax Project

*A. Bartl (AT)*

The TEX2MAT Project

*P. Kählig (AT)*

Christian Doppler Lab for "Design and assessment of an efficient, recycling-based Circular Economy"

*E. Boschmeier (AT)*

The SCIRT Project

*K. Steiner (AT)*

The EnzATex Project

## SESSION D7 / 17:30 - 18:30 / GLASS ROOM

### WORKSHOP: EMERGING IDEAS TO ENABLE CIRCULAR ECONOMY

Chair / *Presidente*: Maria Cristina Lavagnolo (IT)

#### Introductory lectures:

*J. Gutberlet (CA)*

Grassroots innovations driving inclusive circular economy

*Z. Stasiskiene (LT)*

Industry transformation to circular economy: Lithuanian experience

*S. Lee (UK)*

Additive manufacturing in the Circular Economy

# THURSDAY MAY 19

## SOCIAL EVENT

### LIVE MUSIC & DANCING NIGHT / SERATA BALLO & MUSICA DAL VIVO

Taverna "Anema e Core", Via Sella Orta 1, Capri / h. 22:00

Just a few steps away from the congress centre, there is the Taverna Anema e Core, the most famous night club on the island, a must for those who want to fully immerse in the best and authentic Caprese fun. "Anema e core" is the local dialect for "soul and heart" and here guests have their heart and soul lifted by the lighthearted music, dancing and easy smiles of the staff and guests.

The soundtrack of Anema e Core is a unique musical combination of the classical Neapolitan repertoire mixed with Latin American, old Italian songs, American pop, beat, rock and latest summer hits. .

Medleys are the star of the evenings and never the same because the atmosphere is always different, creating unique live scenarios involving the public, staff and the band. Each evening is unique. Music is the entertainment and the live shows are always full of instruments: sax, classical guitar, electric guitar, bass, drums and more.

Many are the guests, national and international, who contributed to the success and the myth of the Taverna. Celebrities from the fashion world to Hollywood stars, from football to NBA players, from the world pop scene to royal families. Who knows who the person sitting next to you could be!

**Entry ticket: € 35 per person** (1 cocktail included).

Ticket to be paid directly at the club.

*Proprio a pochi passi dal centro congressi, si trova il locale più frequentato delle notti capresi, che da oltre 20 anni rappresenta il simbolo del divertimento Made in Capri: la Taverna Anema e Core.*

*Il locale di fama internazionale è di fatto il fulcro della movida caprese, dove ballare e cantare tutta la notte. Un mix musicale unico è la soundtrack di Anema e Core. Il repertorio classico napoletano si mescola a quello latino-americano, contaminandosi con la musica leggera italiana del passato, il pop americano, il beat, rock, fino ai tormentoni estivi. I medley sono i protagonisti delle serate, ma nessuno è mai uguale all'altro, perché l'atmosfera è sempre diversa, s'improvvisa, nascono veri e propri siparietti che coinvolgono pubblico, staff e band.*

*La vera forza di Anema e Core è proprio il culto dell'ospitalità. L'energia e l'entusiasmo coinvolgono tutti, il pubblico è al centro dello spettacolo, si balla e si canta anche sui tavoli o esibendosi con la band.*

*Moltissimi sono gli ospiti, personaggi famosi, celebrities nazionali e internazionali che hanno contribuito al successo e al mito della Taverna, appartenenti ai mondi più disparati: dal fashion al calcio, dallo star system hollywoodiano all'NBA, dalla scena pop mondiale fino ad arrivare, addirittura, alle famiglie reali. Chissà chi potrebbe esserci al tavolo accanto al vostro!*

**Biglietto d'ingresso: € 35 a persona** (include posto a sedere e 1 drink).

*Il biglietto si acquista direttamente al club.*

DAY 3 / FRIDAY  
MAY 20

# FRIDAY MAY 20

## MORNING

SESSION A8 / 9:00 - 10:00 / CINEMA HALL / TRANSLATION ENG-ITA

### RECOVERY OF RESOURCES FROM VEHICLES

Chair / *Presidente*: Silvia Serranti (IT)

*A. Santini (IT)*

Car recycling industry: present issues and future challenges

*A. Holzer, M. Baldauf, S. Windisch-Kern, L. Wiszniewski, H. Raupenstrauch (AT)*

New insights into the influence of impurities on the high-temperature behavior of the lithium-ion battery cathode material NMC (LiNi<sub>0.6</sub>Mn<sub>0.2</sub>Co<sub>0.2</sub>O<sub>2</sub>) under reducing conditions for use in the InduRed process

*G. Torta, F. Passarini, L. Ciacci, I. Vassura (IT)*

Developing an industrial recycling process of rare earth elements from electric motors of the e-mobility

*A. Farsi, M.A. Rosen (CA)*

Thermal management of a hydrogen electric vehicle integrating a fuel cell and battery

*M. Ravina, I. Bianco, M. Minardi, D. Panepinto, M. Zanetti (IT)*

Analysis of the economic and environmental cost of dismantling and recovering plastic components from vehicles

SESSION B8 / 9:00 - 10:00 / POLLIO HALL

### COMPOSTING

Chair / *Presidente*: Rainer Stegmann (DE)

*Z.K. Chong, K. Kuchta (DE)*

Industrial composting of biodegradable plastic packaging: Lab-scale and on-field disintegration tests

*J. Polanšek, L. Luskar, Ž. Trošt, B. Čeh (SI)*

Correlation between precipitation and leachate at on-farm composting

*R. Malesani, A. Schievano, A. Pivato (IT)*

Process optimization measures for heat recovery systems: results from pilot scale experiments

*A. Karničnik, M. Rak Cizej, B. Čeh (SI)*

Diversity of fauna in composting hop waste biomass in winter

---

COFFEE BREAK / 10:00 -10:30

## SESSION C8 / 9:00 - 10:00 / HOTEL SYRENE

### EXPLORING NEW OPTIONS IN CIRCULAR ECONOMY

Chair / *Presidente*: Margherita Ferrante (IT)

*E. Ribeiro-Rodrigues, A. P. Bortoleto (BR)*

Exploring social norms influence on waste prevention behavior through an agent-based modeling and simulation

*G. Mancini, L. Lombardi, A. Luciano, D. Bolzonella, P. Viotti, D. Fino (IT)*

Industrial symbiosis in the waste-wastewater-energy nexus: LCA of different management scenario

*F. Ardolino, G.F. Cardamone, U. Arena (IT)*

Environmental performances of alternative management schemes for plastics from Construction & Demolition waste: the long forgotten fraction

*G. Fiorentino, A. Zucaro, M. Tamaro, G. Ansanelli (IT)*

Environmental and economic evaluation of a new PV waste recycling process

## SESSION D8 / 9:00 - 10:00 / GLASS ROOM

### WORKSHOP: ROLE OF SINK IN CIRCULAR ECONOMY

Chair / *Presidente*: Raffaello Cossu (IT)

Several waste materials, further to reusables and the traditional fractions of MSW which are normally considered in source segregation programs (plastics, paper, cardboard, glass containers, cans, putrescibles, etc.), are being increasingly considered for recovery, reuse or recycling as urban resources. But waste which cannot be recycled, or materials after several recycling loops, still need to be disposed in a sustainable way and should find a safe sink, where contaminants should be immobilized and controlled. allowing to close the material loops in Circular Economy, as it happens in any biogeochemical circle.

The role of sink can be played by different alternatives (e.g. agriculture soil receiving compost, buildings and roads receiving stabilizes ashes, landfilling) and can be summarized with the concept of Back to Earth Alternatives (BEA).

The sinks must be sustainable which means that adverse impact (eg. leaching of contaminants, mechanical instability, etc.) should be avoided.

Normal landfills, constructed according to actual legislations, are not sustainable.

A sustainable landfill should be properly designed including pretreatment and in situ treatment, aimed to reach a Final Quality standards set for respecting environmental sustainability. This goal should be supported by deeply updated EU and national regulations.

---

COFFEE BREAK / 10:00 -10:30

# FRIDAY MAY 20

## MORNING

### FOCUS SESSION IV

CINEMA HALL / 10:30-11:20

**ELECTRIC VEHICLES: WHICH SORT OF WASTE DO THEY PRODUCE? HOW CAN THEY BE RECYCLED? VEICOLI ELETTRICI: QUALI RIFIUTI SI ORIGINERANNO E COME POTRANNO ESSERE RICICLATI?**

*In this session a service of simultaneous translation English - Italian will be provided*

The number of cars in the world has grown from just a few thousand in 1900 to >1.4 billion in 2020. Cars contain myriad valuable materials so at end-of-life these materials can be recovered. This typically happens at authorised facilities. In the European Union (EU), by law, 95% of a car's weight must be recycled when scrapped. Cars are approximately 75% metal and 25% fluids, plastics, fabrics and rubber by weight. Typical steps in the scrappage process may include: harvesting of components that are still fit for use on other vehicles e.g. tyres/wheels, radios, lights; depollution of hazardous materials; battery removal and reuse/recycling; shredding; removal of magnetic metals; an "heavy media process" to remove non-ferrous metals and heavy plastics; and vacuum separation of foam, rubber and plastics (~39 different types of plastics and polymers are used in car manufacturing).

However, the global car fleet is changing quickly as we strive to reduce diesel and petrol cars in order to address urban air pollution and climate change. In particular, the electric car market is booming; the global fleet exceeded 5.1 million vehicles in 2018 and is expected to reach 140 million by 2030. The main compositional difference between fossil-fuelled and electric cars is the batteries. Most electric vehicles use Li-ion batteries. Such energy storage systems are essential for hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs). It is predicted that by 2030, the worldwide number of used Li-ion batteries will reach ~2 million metric tons annually. In the EU, Directive 2006/66/EC has required since 2006 that at least 50% of the materials contained in used batteries and accumulators be recycled. Producers are mandated to collect used batteries at their own expense before recycling themselves, or via a specialist partner.

The recycling of an electric vehicle's battery is particularly challenging. Ideally, we should aim to reduce the amount of waste generated by a battery at end-of-life and promote the reuse of as many components and resources involved in its manufacture as possible. However, very little recycling of Li-ion batteries currently occurs; only 2–3% of Li-ion batteries are collected and sent for recycling in Australia, and the recycling rates in the EU and the USA are probably <5%. There are many reasons for this, including logistical issues, technical



constraints, economic barriers, and skills/regulatory gaps. Hence, as the Li-ion battery industry lacks a distinct route to large-scale economical recycling, researchers and manufacturers have not engaged on improving recyclability. The focus has instead been on lowering costs and increasing battery longevity and charge capacity. In addition, most Li-ion batteries that get recycled undergo complex, safe disassembly steps prior to an energy intensive, high-temperature melting-and-extraction, or smelting, process similar to those used in the mining industry. These large-scale plants are costly to build and operate, require complex equipment to treat harmful emissions generated by the process and don't recover all valuable materials.

In this focus session, we will discuss the multiple challenges associated with end-of-life treatment of electric vehicles, including both technical and non-technical issues.



**Moderator:**

**Prof. Ian Williams**, *University of Southampton (UK)*

He is a Professor of Applied Environmental Science and Associate Dean (Enterprise) in the Faculty of Engineering and the Environment at the University of Southampton, UK. He has an established track record in the field of environmental pollution and waste management. His work at Southampton has focused on pollution, waste- and carbon-related issues. He has published extensively in books and peer-reviewed journals as well as producing over 100 commercial project reports.

---



**Panelists:**

**Prof. Marc Rosen**

*Ontario Tech University (CA)*



**Gianluca Torta**

*University of Bologna (IT)*

# FRIDAY MAY 20

## MORNING

SESSION A9 / 11:30 - 12:30 / CINEMA HALL / TRANSLATION ENG-ITA

### LANDFILL MINING

Chair / *Presidente*: Raffaello Cossu (IT)

*G. Denafas, I. Pitak, J. Kruopienė, D. Streikus, K. Romaneckas, A. Jasinskas (LT)*  
Comparison of stored and renewable energy potentials in landfill conditions: case study for Kaunas waste management region, Lithuania

*W. Wulyapash, A. Phongphiphat, S. Towprayoon, J. Fellner (TH)*  
Characterisation and carbon intensity of RDF from landfill mining: a case study in Samut Prakan, Thailand

*D. Parida, M. Datta, G.V. Ramana (IN)*  
Physical characteristics and contaminants of potential concern in gravel like material reclaimed from an old MSW dump in India for reuse in off-site applications

*M.C. Lavagnolo, P. Fonkou, E. Elame (IT)*  
Recovery of abandoned waste disposal areas in the framework of circular economy in Yaoundé, Cameroon

SESSION B9 / 11:30 - 12:30 / POLLIO HALL

### RECOVERY FROM ORGANIC WASTE: CASE STUDIES

Chair / *Presidente*: Giovanni Beggio (IT)

*N. Mahdjoub, Y. Omartjee. C. Trois (ZA)*  
Pulp and paper mill sludge pelletizing for energy as a landfill diversion option for South-Africa

*C. Andreola, V. Maceratesi, J. González-Camejo, A.L. Eusebi, F. Fatone (IT)*  
Hydrolysis and thermochemical technologies for the recovery of bio-based fertiliser from fishery waste

*K. Sobieraj, K. Świechowski, K. Pawęska, A. Białowiec (PL)*  
Characteristics and phytotoxicity assay of biochar derived from rose pruning waste

*M. Miccio, M. Fraganza, A. Zainutdinova, P. Brachi, M. Casa, G. Ferrari, M. Iannuzzo (IT)*  
A preliminary assessment of lab techniques for valorization of toasted hazelnut cuticles

---

LUNCH BREAK / 12:30-15:00

## SESSION C9 / 11:30 - 12:30 / HOTEL SYRENE

### RECYCLING OF C&D WASTE

Chair / *Presidente*: Sheryl Lee (UK)

*S. Sorlini, A. Diotti, A. Abbà, L. Cominoli, G. Plizzari (IT)*

Reuse of recycled aggregate for concrete: preliminary results on mechanical and environmental behaviour

*S. Lee, E. Randviir, E. Horwich, D. Lacy, N. Hurst, C. Banks (UK)*

Using recycled fine aggregate for use in 3D concrete printing: a circular approach to demolition waste

*V. Ruffini, G.M. Cappucci, P. Neri, A. Sirico, F. Zanotto, A. Balbo, B. Belletti, P. Bernardi, A. Malcevschi, C. Monticelli, A.M. Ferrari (IT)*

Life cycle assessment of a bridge column made of concrete and biochar

*K. Mantalovas, I.P. Dunn, F. Acuto, B. Barakat, A. Abou Jaoude, O. Yazoghli-Marzouk, I. Srour, G. Di Mino (IT)*

State of practice in the C&DW sector while pursuing circular economy: the Italian recycled materials market in road engineering

## SESSION D9 / 11:30 - 12:30 / GLASS ROOM

### WORKSHOP: WHY DON'T THE PUBLIC TRUST EVIDENCE AND ADVICE PROVIDED BY ENVIRONMENTAL EXPERTS?

Chairs / *Presidenti*: Ian Williams, Peter Shaw (UK)

The title of this workshop is clearly a huge, sweeping statement and a massive over-simplification! Or is it? We expect many reading this text will agree with the general standpoint expressed by the question. In our experience, (academic) environmental scientists and engineers are often regarded by the public as competent but remote and “untrustworthy”. Reasons given for distrust in environmental science / engineering include that: Academics receive funding from (government-run) research agencies and/or private companies and so cannot be impartial / objective. Academics use their papers and presentations to promote particular “liberal” political, social and/or cultural agendas. Academics are arrogant about their expertise and dismissive of non-evidence-based views. [Full appetizer available on the website and mobile app.](#)

This workshop will address the question “Why don't the public trust evidence and advice provided by environmental experts?” from a waste and resource management perspective. An initial overview presentation will set the context for the workshop; this will outline the reasons for asking this question with illustrative examples. As an introductory exercise, participants will be asked to provide their views on the topic, and the other questions it generates. Working in small groups, participants will be tasked to:

1. Share their views on this question, how it makes them feel as “experts”, how the views of the public impact on waste / resource management in public health, environmental, economic and social terms;
2. Discuss if and how actions might be taken to increase trust in environmental expertise;
3. Share the outcomes of small group discussions in a plenary session involving all participants.

# FRIDAY MAY 20

## AFTERNOON

### SESSION A10 / 15:00 - 16:00 / CINEMA HALL / TRANSLATION ENG-ITA

#### LCA AND MATERIAL FLOW ANALYSIS

Chair / *Presidente*: Antonella Luciano (IT)

*G. Moscatelli, T. Fruergaard Astrup (DK)*

Cascading recycling: opportunities and challenges

*J. Lederer, A. Gassner, M. Pözlner, J. Fellner (AT)*

The consumption-based carbon and material footprint: an indicator in the context of urban mining in cities

*F. Ardolino, C. Di Domenico, F. Costarella, U. Arena (IT)*

An information system to enhance the sustainability of solid waste management

*D. Ita-Nagy, I. Vázquez-Rowe, R. Kahhat (PE)*

Using Material Flow Analysis to assess the flows of mismanaged solid waste into the ocean - A case study of Peru

*A.B. Moldes, X. Vecino, J. Bombín, A. Ortega, J.M. Cruz (ES)*

A circular economy model for the winery industry

### SESSION B10 / 15:00 - 16:00 / POLLIO HALL

#### THERMAL TREATMENT RESIDUES

Chair / *Presidente*: Maria Chiara Zanetti (IT)

*E. Korotenko, M. Šyc, L. Grič, T. Baloch (CZ)*

Optimization of water washing for recovery of salts from calcium-based APCr

*M. Syc, J. Hyks, T. Baloch, J. Valentin, E. Korotenko, B. Zach (CZ)*

Steps towards modern bottom ash utilization in the Czech Republic

*A. Piemonti, A. Conforti, L. Cominoli, A. Luciano, S. Sorlini, G. Plizzari (IT)*

Concrete mixtures with EAF slags as partial replacement of natural aggregates: a preliminar study

*H. Muñoz Sierra, M. Syc, B. Zach, A. Shtukaturova, E. Korotenko (CZ)*

The use of wet magnetic separation technology and liberation processes for the improvement of the copper concentrate product obtained by gravimetric concentration treatment from the fine fraction of incineration bottom ash

---

COFFEE BREAK / 16:00 -16:30

## SESSION C10 / 15:00 - 16:00 / HOTEL SYRENE

### BIODEGRADABLE WASTE

Chair / *Presidente*: Rachele Malesani (IT)

*S. Castelluccio, C. Comoglio, S. Caruso, S. Fiore (IT)*

Environmental reporting in the Italian biodegradable waste treatment plants

*P.J. Shaw, H. Barker, D.M. Smith (UK)*

Unavoidable and potentially avoidable food waste from domestic households: preparation residues

*A. Zucaro, G. Ansanelli, M. Tammaro, L. Cutaia, R. Chifari, G. Fiorentino (IT)*

BIOCIRCULARCITIES project: circular bioeconomy in urban contexts

*F. Eblagon, Z. Trost, B. Ceh (PT)*

End of life biomass waste management: impact of guiding material on supported crops

## SESSION D10 / 15:00 - 16:00 / GLASS ROOM

### WORKSHOP: FUTURE OF SINGLE-USE CONSUMER PRODUCTS

Chair / *Presidente*: Johann Fellner (AT)

Among the single use products, plastic plays an important role either positively being a very good material in terms of technical performance, either negatively due to the adverse environmental impact when disposed in an uncontrolled way.

EU issued recently a Directive addressing the ban of some specific items (cotton bud sticks, food containers, cutlery, etc) focusing on quality of plastics and alternative materials and/or solutions.

The workshop will discuss the most controversial issues related to this topics (which future for single use plastics, how reliable are alternative options, effectiveness of some materials bans).

#### **Invited speakers:**

*Maria Cristina Lavagnolo, University of Padova (IT)*

*Alessandra Poletini, University of Roma La Sapienza (IT)*

---

COFFEE BREAK / 16:00 -16:30

# FRIDAY MAY 20

## AFTERNOON

### SESSION A11 / 16:30 - 17:30 / CINEMA HALL / TRANSLATION ENG-ITA

#### ENERGY RECOVERY FROM WASTE

Chair / *Presidente*: Salvatore Masi (IT)

*D. Panepinto, I. Bianco, M. Zanetti (IT)*

An overview of thermal treatment environmental aspects

*T. Schwarzboeck, M. Hahn, P. Aschenbrenner, S. Spacek, J. Fellner (AT)*

In search for the material composition of refuse-derived fuels by means of balance equations

*B. Ruffino, M. Minardi, M. Guglielmino, F. Bonino, M. Zanetti (IT)*

Assimilation of automobile shredder residues (ASRs) to a solid recovered fuel (SRF): a step towards the increase in material recovery

*C. Nell, C. Trois (ZA)*

The development of a Waste-to-Energy Roadmap for South Africa – Findings from stakeholder engagements

### SESSION B11 / 16:30 - 17:30 / POLLIO HALL

#### ANAEROBIC DIGESTION

Chair / *Presidente*:

*G. De Gioannis, M. Falzarano, A. Muntoni, A. Poletti, R. Pomi, A. Rossi, D. Spiga (IT)*

Anaerobic co-digestion of single-use bioplastics and food waste

*D. Panepinto, A. Casasso, M. Puleo, M. Zanetti (IT)*

Economic viability and greenhouse gas budget of the biomethane retrofit of a biogas plant

*E. Ciotola, A. Cesaro, G. Esposito, F. Pirozzi (IT)*

The sustainable use of anaerobic digestate: closing the material loop in a circular perspective

*A. Kosheleva, K. Kuchta (DE)*

Implementation of in-situ biomethanation within PtX at a biogas plant

**SESSION C11 / 16:30 - 17:30 / HOTEL SYRENE**

**INDUSTRIAL WASTE**

Chair / *Presidente*: Evangelos Gidakos (GR)

*P. Crocetti, J. González-Camejo, K. Li, A.L. Eusebi, F. Fatone, A. Graziani (IT)*

Preliminar study for the circular application of treated dredged sediments as road infrastructures

*B. Velappan, N. Vedaraman, S. Abinandan, J. Kanagaraj (IN)*

Closed loop integrated resource recovery from liming process waste – A pathway for sustainable leather processing

*J. Menendez, R. Alvarez, A. Ordoñez, J. Loredó (ES)*

Coal mining closure and circular economy

*J. Rombi, M. Olianias, M. Salis, A. Serpi, M. Coni (IT)*

Mechanical performance of cement bound granular pavement layers incorporating anhydrous Calcium Sulphate industrial by-product

# FRIDAY MAY 20

## AFTERNOON

### FOCUS SESSION V

CINEMA HALL / 10:30-11:20

LIGHTS AND SHADES IN CIRCULAR ECONOMY / LUCI E OMBRE  
DELL'ECONOMIA CIRCOLARE

*In this session a service of simultaneous translation English - Italian will be provided*

In Corona times and during the Ukrainian war, deficits in product and material availability become apparent. This is due to an interruption of supply chains, internationalization of production sites but also from limited natural resources. This situation should make clear the urgent need for improving and expanding our recycling activities.

So, where do we stand with our recycling activities? How often can we recycle a material or product at what quality? How can we make product recycling more transparent and more informative to the consumer for their purchase decision and do we have to optimize circular economy regarding material and product avoidance? How do we deal with the non - avoidable residues? Industry claims recycling successes but how much is "Greenwashing"?

Other themes to discuss may be the effect of sending used electrical and electronic products, separately collected plastics and fashion from Europe to economically developing countries?

Can we base our strategy for saving resources solely on future inventions and/or the self - regulation of the market? What are the roles of politics, media and society?

We will discuss these urgent themes of today with our guests from politics, media and science including the participation of the audience.

*In tempi di Coronavirus e di guerra in Ucraina, sono emersi deficit di prodotti e di reperibilità dei materiali. Il fenomeno è dovuto all'interruzione della catena di fornitura, all'internazionalizzazione delle sedi di produzione, ma anche alla scarsità di risorse naturali. Questa situazione dovrebbe rendere evidente l'urgente necessità di migliorare ed estendere le attività di riciclo.*

*A che punto siamo con i sistemi di riciclo? Quante volte possiamo riciclare un materiale o prodotto e a che livello di qualità? Come possiamo rendere l'attività di riciclo più trasparente e più esplicita ai fini di un acquisto più consapevole da parte del consumatore? C'è bisogno di ottimizzare l'economia circolare in termini di riduzione di materiali e prodotti? Come gestiamo i residui non riducibili? Le industrie vantano successi nell'ambito del riciclo, ma quanto di tutto ciò è considerabile "Greenwashing"?*

*Altri temi da affrontare includono l'esportazione di apparecchiature elettriche e prodotti elettronici usati e plastiche dall'Europa verso Paesi in via di sviluppo.*



*Possiamo affidare la nostra strategia per preservare risorse, esclusivamente alle future invenzioni e/o all'autoregolamentazione del mercato? Quali sono i ruoli della politica, dei media e della società?*

*Esperti in politica, media e scienza prenderanno parte alla discussione, alla quale parteciperà attivamente il pubblico stesso.*



**Moderator:**

**Prof. Rainer Stegmann, Hamburg Technical University (DE)**

He was Professor from 1982 to 1990 at the Institute of Environmental Protection and from 1991 to 2008 Head of the Institute of Waste Management at the Technical University of Hamburg, Germany. He is one of the prominent researchers in the field of waste management and provided in particular fundamental scientific contributions on sustainable landfilling, anaerobic digestion, biogas generation and control, treatment of contaminated soil. He has published more than 300 scientific papers and several books.

---



**Panelists:**

**On. Paolo Russo**

*Chamber of Deputies  
Italian Parliament (IT)*



**Prof. Andreas Bartl**

*TU Wien (AT)*



**Prof. Johann Fellner**

*TU Wien (AT)*

# FRIDAY MAY 20

## SOCIAL EVENT

### CLOSING GALA DINNER / CENA DI GALA

Restaurant "Al Capri", Via Roma 38, Capri / h. 20:30

As per tradition, to celebrate the closure of the conference, all delegates are invited to a formal dinner at the restaurant Al Capri (located in Via Roma 38) just a few steps away from the Piazzetta, with a spectacular panoramic view.

Dancing party at the end of the dinner!

50% of the price is included in the Symposium entrance fee. The remaining 50% will be paid by each delegate and amounts to € 40,00 + VAT 22%.

Tickets **must be collected** from the Secretariat desk starting from Thursday.

Accompanying persons should purchase the full ticket (€ 80,00 + VAT 22%) from the secretariat.

*Nella serata di venerdì, a conclusione dei lavori, tutti i partecipanti sono invitati a*

*prendere parte alla cena di chiusura presso il ristorante Al Capri, situato a pochi metri dalla Piazzetta, in Via Roma 38, con una spettacolare vista panoramica sul mare.*

*Musica con DJ alla fine della cena fino a tarda notte!*

*Il 50% del costo è incluso nella quota d'iscrizione al Simposio, la restante metà è a carico dei partecipanti ed ammonta a € 40,00 + IVA 22%.*

*Prenotazione obbligatoria.*

*I partecipanti **devono ritirare il biglietto** presso il Banco Registrazioni a partire da giovedì.*

*Eventuali accompagnatori dovranno acquistare il biglietto intero (€ 80,00 + IVA 22%) al banco registrazioni.*



POSTER & VIDEO  
SESSIONS / SESSIONI  
POSTER E VIDEO

# POSTER SESSION

## SESSIONE POSTER

Posters will be accessible to Symposium delegates at all times in digital format. Three designated computers are always available in the foyer of the Congress Centre to browse through all posters (PDF files) and watch the pre-recorded presentations by their authors.

These materials will be available also on our virtual platform and Symposium app. Delegates will be able to send questions to the authors via chat, Q&A or video call through the virtual platform.

*La sessione Poster sarà accessibile digitalmente per l'intera durata del Simposio, attraverso la nostra piattaforma virtuale. Tre postazioni pc saranno sempre disponibili nel foyer del Centro Congressi per visualizzare tutti i poster in PDF, guardare le presentazioni pre-registrate degli autori e inviare le proprie domande tramite la sezione Q&A e la chat.*

*Sarà inoltre possibile contattare direttamente gli autori per incontrarsi di persona o virtualmente e approfondire la discussione del poster.*

---

**P01** / E. Dziobek, A. Nowaczek (PL)

Supporting SMEs in the development in accordance with circular economy - SPIN Project in Poland

**P02** / P. Donyanavard, Q. Yuan (CA)

Potential for extracting rare earth metals from today's electronic devices

**P03** / C. Siracusa, F. Quartinello, A. Pellis, G.M. Guebitz (AT)

Study of polyester specific hydrolysis performed by two different cutinases

**P04** / L. Hernández-Pérez, M.C. Martí-Calatayud, M.T. Montañés, V. Pérez-Herranz (ES)

Electrorecovery of bismuth from a copper waste effluent: an initial approach

**P05** / I. Gabriele, M. Race, S. Papirio, G. Esposito, F. Pirozzi (IT)

Use of Cannabis sativa L. to implement the phytoremediation of soil contaminated by pyrene

**P06** / S. Mihalyi, F. Quartinello, G. M. Guebitz (AT)

Recovery of cellulases for circular application in textile waste recycling

**P07** / C. M. Warne, F. Quartinello, D. Ribitsch, G.M. Guebitz (AT)

New tools in the plastics circular economy: rumen fluid for hydrolysis of polyesters

**P08** / Z. Trost, B. Ceh (SI)

Waste hop biomass management options

**P09** / J. M. Cruz, C. González, X. Vecino, A. B. Moldes (ES)

Biodegradation study of polyethylene-based plastics in presence of corn steep liquor

**P10** / N. Junakova, J. Junak, M. Balintova (SK)

Production of sustainable concrete based on reservoir sediments in accordance with the principles of the circular economy

- P11** / *S. das Neves Silva, L. Frisso, L. H. Yamane, R. Ribeiro Siman (BR)*  
 Implantation of a printed circuit board recycling industry in Brazil: environmental aspects
- P12** / *Y. Sagrillo Pimassoni, L. H. Yamane, R. Ribeiro Siman (BR)*  
 Recovery of rare earth elements from WEEE: challenges and research needs
- P13** / *K. Steiner, M. Egermeier, R. Putz, G.M. Guebitz, F. Quartinello, D. Ribitsch (AT)*  
 Enzymatic reprocessing and recycling of textile waste
- P14** / *I. Bonadies, R. Capuano, R. Avolio, R. Castaldo, M. Cocca, G. Gentile, M. E. Errico, M. Avella (IT)*  
 Sustainable composites from beverage cartons scraps
- P15** / *M. Muradin, J. Kulczycka, G. de Clercq, R. Verhe (PL)*  
 Zero waste bioethanol production technology. applying the LCA tool to assess environmental impacts in a circular economy context
- P16** / *A. Estokova, M. Fabianova (SK)*  
 Simplified LCA analysis of waste treatment from the wooden building
- P17** / *D. Camana, A. Fedele, F. Gallo, A. Manzardo (IT)*  
 Assessing environmental sustainability of projects with different tools. A life cycle perspective
- P18** / *M. Holosova, A. Estokova, M. Smolakova, A. Luptakova (SK)*  
 Waste in cement composites exposed to the biocorrosion
- P19** / *T. Distler, K. Steiner, K. Huemer, S. España Orozco, G.M. Guebitz (AT)*  
 UV-detoxification of a sulfite liquor and separation by column chromatography
- P20** / *E. Karamanova, G. Avdeev, S. Atanasova, I. Piroeva, A. Karamanov (BG)*  
 Structure and phase composition of ceramics from municipal incinerator bottom ashes
- P21** / *D. Caracciolo, F. Montagnaro, M. Balsamo, F. Di Lauro, M. Urciuolo, R. Migliaccio, G. Ruoppolo (IT)*  
 Tannery sludge: the new biomass
- P22** / *A. Del Borghi, L. Moreschi, M. Gallo (IT)*  
 A critical environmental analysis of strategic materials towards energy transition
- P23** / *L. Wiszniewski, K. Doschek-Held, Z. Raonic, A. Holzer, H. Raupenstrauch, P. Presoly (AT)*  
 Physical and chemical characterizations of high-value residues for a pyrometallurgical recycling process
- P24** / *E. Hroncová, J. Ladomerský, D. Ladomerská (SK)*  
 The cooperation between research-educational institution and manufacturing companies in the implementation of cleaner production projects
- P25** / *E. Paone, M. Miceli, A. Malara, G. Ye, E. Mousa, E. Bontempi, P. Frontera, F. Mauriello (IT)*

# POSTER SESSION

## SESSIONE POSTER

Spent Lithium-Ion batteries: from waste to an efficient heterogeneous catalyst for the reductive upgrading of biomass-derived furfural

**P26** / A. Masiello, A. Spagnuolo, C. Vetromile, M. R. di Cicco, G. Costanzo, A. Marotta, C. Lubritto (IT)

The project MELT: end-of-life tires for the well-being of buffaloes

**P27** / P. Frontera, A. Malara, A. Macario (IT)

Reuse and recycling strategies of new "critical raw materials"

**P28** / M. Wojnicki, P. Zabinski, R. Kowalik, K. Kolczyk-Siedlecka (PL)

Pt, Pd, Rh and Au ions adsorption on activated carbon in a continuous flow reactor supported by microwaves radiation

**P29** / M.A. Mistoh, J. Janaun, A. Galassi (MY)

Appropriate technology pyrolysis processor for production of fuel from plastic waste: a mini review

**P30** / A. C. Revelo Rodríguez, C. J. Cobo Ceacero, T. Cotes Palomino, A. B. López García, C. Martínez García (ES)

Solid biofuel in the form of coffee grounds pellets

**P31** / J. Rastelli, M. Alvarado Chinchilla, F. Heredia, J. C. Navarro Bautista, A. B. López García, T. Cotes Palomino, C. Martínez García (ES)

Valorisation of organic waste (almond and hazelnut shells) to obtain sustainable construction materials. Applying the circular economy

**P32** / F. Feher, J. Lederer, J. Mühl (AT)

Properties of concretes containing treated waste incineration bottom ash as partial substitute for natural aggregate

**P33** / R. Savio, G. Ferrari, A. Pezzuolo, M. Guidolin, M. C. Lavagnolo (IT)

Agricultural by-products for hydrogen production: current status and results

**P34** / P. Zabinski, K. Kolczyk-Siedlecka, R. Kowalik, M. Wojnicki (PL)

Pt, Pd, Rh and Au ions adsorption on activated carbon in batch reactor supported by microwaves

**P35** / A. Barrera, H. Aldoori, Z. Bouberka, A. Nadim, Y. Agguine, S. Eddarir, P. Supiot, C. Foissac, U. Maschke (FR)

Degradation of brominated flame retardant in poly (Acrylonitrile Butadiene Styrene)

**P36** / N. Malesardi, M. Ragazzi, E.C. Rada (IT)

Municipal solid waste management during the pandemic in EU contest: first COVID-19 wave

**P37** / F. Minniti, F. Tatti, G. Farabegoli, G. Costa, L. Lombardi, A. Rossi, R. Pomi, A. Poletti (IT)

Biomaterials, biofuels, CO<sub>2</sub> sequestration and circularity (BBCircle). Evaluation of biorefinery applicability in the Lazio region

# VIDEO SESSION

## SESSIONE VIDEO

This virtual-only session includes pre-recorded video presentations by Authors who cannot attend in person. Their videos will be made available on our virtual platform, where attendees will be able to send their questions and contact the Authors via chat or video calls.

*La Sessione Video include presentazioni pre-registrate degli autori impossibilitati a partecipare in presenza. Tale sessione sarà disponibile solo online sulla nostra piattaforma virtuale. Sarà possibile inviare domande agli autori attraverso la sezione Q&A, la chat o tramite videochiamata.*

---

**V01 / Y. Zhou, C. Liao, S. Ma, K. Shih (HK)**

Pb stabilization by a new chemically durable orthophosphate phase: insights into molecular mechanism with X-ray structural analysis

**V02 / N.R. Khandaker, M.M. Rahman, Md.A. Rabby, T.K. Ray, M. Alam, T. Ahmad (BD)**

The role of bhandari (treasure hunters) in resource recovery from Municipal Solid Waste in Dhaka Bangladesh

**V03 / H. Habib, M. Wagner, C.P. Baldé, L. Herreras Martínez, J. Huisman, J. Dewulf (BE)**

Mind the gap - Scanning WEEE complementary flows in the European Union

**V04 / L.H. Xavier (BR)**

Boundaries and perspectives of (in)formality on e-waste urban mining

**V05 / F. Rossetti Cúnico, L.H. Xavier O. Estevam Alarcon (BR)**

Urban mining and circular economy approach in the material recovery from permanent Nd-Fe-B magnets

**V06 / S. Srivastava, C. Trois (ZA)**

Characterisation of waste Fat, Oil and Grease (FOG) for sustainable treatment options with emphasis on gross heat value

**V07 / P.H. Guedes, L.H. Xavier, M. Souza (BR)**

Circular economy applied to the oil recovery from refrigerators: a Brazilian case study

**V08 / S. H. Akyildiz, R. Bellopede, S. Fiore, B. Yalcin, H. Sezgin, I. Yalcin-Enis (TR)**

Preliminary assessment of microfibers amount in textile wastewater

**V09 / L.H. Xavier (BR)**

Aspects of the urban mining in Brazil

# POST SYMPOSIUM EVENT

## SATURDAY 21 MAY

### CAPRI BOAT TOUR / TOUR AROUND CAPRI ON TRADITIONAL GOZZO BOAT / h. 10:00 - 14:00

Once the Symposium is over, on Saturday morning join us in a boat tour around the island to explore its beauties aboard a typical gozzo. During the tour, we will have the unmissable opportunity to admire the most wonderful and iconic sights of Capri, including the Faraglioni, the famous Blue Grotto, the lighthouse at Punta Carena and Villa Malaparte. Don't forget your bathing suit for a swim in the crystalline sea of Capri!

#### PROGRAMME

- Meeting point at 10:00 at the Piazzetta
- Arrival at Marina Grande (Port of Capri) by funicular
- Departure aboard the traditional gozzo boats (estimated duration 3/4 hours)
- Visit at the Blue Grotto
- Stop for diving and swimming
- Packed lunch provided by the organisers (Caprese sandwich, natural mineral water, 1 fruit, Caprese cake)
- Back to the Piazzetta by funicular

#### Price: € 85 + VAT 22%

What's included: funicular tickets, boat ticket, packed lunch, entrance fee to the Blue Grotto.

To book your place please contact the travel agency in the congress center. Should you book on site, please note that only payment by cash is accepted.





# EVENTO POST SIMPOSIO

## SABATO 21 MAGGIO

**GITA IN BARCA / ESCURSIONE ALLA SCOPERTA DI CAPRI SU BARCHE TIPICHE / h. 10:00 - 14:00**

A fine Simposio, il sabato mattina unisciti a noi per esplorare le bellezze dell'isola a bordo di un tipico gozzo caprese. Nel corso dell'escursione, avremo l'imperdibile opportunità di ammirare da un punto di vista privilegiato gli scorci più belli di Capri, tra cui i Faraglioni, la famosa Grotta Azzurra, il Faro di Punta Carena e Villa Malaparte. Non dimenticate il costume da bagno per la sosta tuffi!

### PROGRAMMA

- Appuntamento ore 10:00 alla Piazzetta della funicolare
- Arrivo a Marina Grande con la funicolare
- Partenza per il giro dell'isola con i gozzi (durata di circa 3/4 ore)
- Visita alla Grotta Azzurra
- Sosta per tuffo e nuotata
- Pranzo al sacco fornito dall'organizzazione (panino caprese, acqua minerale naturale, 1 frutto, dolce Capresina)
- Rientro con la funicolare alla Piazzetta di Capri

Costo: € 85 + IVA 22%

Il prezzo include: biglietti funicolare A/R, biglietto gozzo, pranzo al sacco, biglietto d'ingresso alla Grotta Azzurra.

Il termine per prenotarsi è venerdì 20 Maggio ore 18:00. Per coloro che si iscriveranno in loco, si prega di notare che l'unica modalità di pagamento possibile sarà in contanti.

Per prenotazioni si prega di contattare l'agenzia CapriMed al Centro Congressi





TECHNICAL BOARD  
OF COMPANIES,  
ORGANISERS, MEDIA  
PARTNER / COMITATO  
TECNICO AZIENDE,  
ORGANIZZATORI E  
MEDIA PARTNERS

# TECHNICAL COMPANIES BOARD

## COMITATO TECNICO AZIENDE

### COSMO GRUPPO

Cosmo Group is a company located in Noale, near Venice. It was established sixty years ago and today is a leader in the sector of major infrastructure projects and waste management. It employs about 150 employees and operates through five companies of the group: Cosmo Scavi srl, Cosmo Tecnologie ambientali srl, Cosmo Energia, CSR srl (Chemistry and geotechnical laboratory), Hexa Green. In its customer portfolio Cosmo Group counts public bodies and private companies, renowned customers for whom it has created important projects such as the Mestre highway section, Venice Marco Polo Airport, the third lane of the A4 Venice-Trieste highway, the logistics platform in the Port of Trieste, the "All'Angelo" hospital in Mestre.

The plant, located in via Mestrina, consists of 160,000 square meters of technological systems for the treatment, disposal and recovery of special and industrial waste with an average recovery rate of 60%. The production cycles take place in the covered area where, thanks to the most advanced technologies, each cycle is optimized, ensuring maximum safety.

In recent years, Cosmo Group has distinguished itself for the strong input given to the dissemination of clean and sustainable technologies. It has installed a photovoltaic system in its plant in Noale that generates a maximum power of 840 kWp and covers about 35% of internal needs. Clean energy, such as that produced by the biomass plant, another 995 kw entirely given to the power grid. Thanks to an Environmental Management system, Cosmo Group evaluates and monitors each activity and internal process, rationalizing the service delivery and management phases, in accordance with the regulations.

Since 2014 it has adopted the model 231: an External Supervisory Body that monitors that the work of the companies complies with the stated principles. Endowed with all the latest certifications, Cosmo Group pursues the safety and quality objectives through an all-female team.

In more recent years, Cosmo Group has launched several projects concerning the corporate social responsibility.

---

Contacts / *Contatti*:

**COSMO GRUPPO**

Via Feltrin 123/125

30033 Noale, Venezia - Italy

Tel. +39 041 5801616

Operational headquarters:

Via Mestrina 46/X

30033 Noale (VE)

email: [info@cosmogruppo.it](mailto:info@cosmogruppo.it)

website: [www.cosmogruppo.it](http://www.cosmogruppo.it)

