19TH INTERNATIONAL SYMPOSIUM ON WASTE MANAGEMENT, RESOURCE RECOVERY AND SUSTAINABLE LANDFILLING
9-13 OCTOBER 2023 / SANTA MARGHERITA DI PULA, CAGLIARI (IT)

SARDINIA 2023

Organised by:
IWWG - International Waste Working Group

Scientific support of:
University of Padova (IT)
BOKU University, Vienna (AT) / Fukuoka University (JP)
Hamburg University of Technology (DE)
Luleå University of Technology (SE) / Tongji University (CN)

SYMPOSIUM GUIDEBOOK / DAILY PROGRAMME, USEFUL INFO, SYMPOSIUM APP, SOCIAL EVENTS, EXHIBITORS, AWARDS, NOTEBOOK

SYMPOSIUM GUIDEBOOK
GUIDA DEL SIMPOSIO

SARDINIA2023

19th INTERNATIONAL SYMPOSIUM ON WASTE MANAGEMENT, RESOURCE RECOVERY AND SUSTAINABLE LANDFILLING

9-13 OCTOBER 2023 / Forte Village, Santa Margherita di Pula (IT)

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With the scientific support of / *Con il supporto scientifico di*:
University of Padova (IT)
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Luleå University of Technology (SE)
Tongji University (CN)

Promoted by / *Promosso da:*
US-EPA - United States Environmental Protection Agency
ENEA - Italian National Agency for New Technologies, Energy and Sustainable Economic Development
EWABA - European Waste-based & Advanced Biofuels Association
GITISA - Italian Group of Environmental Engineering
IBA - Institute of Bioresource and Agriculture
IEA Bioenergy
ISPRA - Italian Institute for Environmental Protection and Research
IWMSA - Institute of Waste Management of Southern Africa
KSWM - Korea Society of Waste Management

Under the aegis of / *Con l'alto patrocinio di:*

MINISTERO DELL'AMBIENTE E DELLA SICUREZZA ENERGETICA

REGIONE AUTÒNOMA DE SARDIGNA
REGIONE AUTONOMA DELLA SARDEGNA

Federal Ministry
Republic of Austria
Climate Action, Environment, Energy, Mobility, Innovation and Technology

TAVOLO DI ROMA

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PRESENTATION
PRESENTAZIONE

The International Symposia Sardinia were established in 1987 in order to make ideas and experiences in the rapidly developing field of waste management and landfilling readily available to professional communities worldwide. Since then the Symposia have rapidly become the international reference forum where every two years planners, operators, public officials and scientists present their relevant experiences and discuss new concepts and technologies of waste management.
All new ideas and approaches applied worldwide in the last three decades were thoroughly debated and reviewed during the numerous sessions in the Symposia, some of them purposely organized in cooperation with the IWWG task groups.
The scientific programme of Sardinia 2023 is structured in 8 parallel sessions for a total of **109 sessions** and includes more than 450 presentations. The presentations are organised in Oral sessions, Workshops, Active Labs and Poster sessions. In addition to these traditional sessions, the Symposium includes four plenary Focus Sessions, to be held in the afternoon, dedicated to specific themes of high public interest.
On Friday 13th October, at 19:30, the **"Life for Waste" Award** will be delivered to this year's winners in a formal ceremony chaired by the President of the Sardinia Region and other important authorities and personalities,

Il Sardinia è un Simposio internazionale, biennale, organizzato dall'IWWG con il supporto scientifico di sei prestigiose Università: Padova, Boku-Vienna, Luleå, Amburgo, Fukuoka e Tongji.
I Simposi Sardinia sono stati istituiti nel 1987 con lo scopo di rendere facilmente disponibili e condivisibili le conoscenze e le esperienze nel campo della gestione dei rifiuti e dello scarico controllato. Da allora sono diventati uno dei principali forum di riferimento a livello mondiale per gli esperti del settore che ogni due anni si ritrovano in Sardegna per presentare e discutere nuove strategie e tecnologie in quella che è unanimemente riconosciuta come una delle vetrine più prestigiose per la ricerca nazionale e internazionale.
Il programma scientifico del Sardinia 2023 è strutturato in 8 sessioni parallele ed include oltre 450 presentazioni selezionate in base alla qualità dal Comitato Scientifico di Programma. Le presentazioni sono state organizzate in sessioni orali, workshop, Active Lab e poster. Oltre alle sessioni tradizionali, il Simposio quest'anno prevede quattro Focus Session plenarie che si terranno tutti i giorni al pomeriggio e saranno dedicate a temi specifici di alto interesse pubblico.
Venerdì 13 ottobre, alle ore 19:30, verrà consegnato il premio Sardinia "A Life for Waste" ai vincitori di questa edizione, durante una cerimonia ufficiale alla presenza del Presidente della Regione Sardegna e altre importanti autorità.

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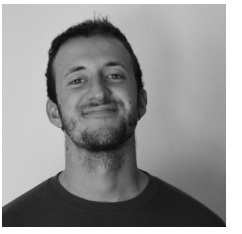

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REGISTRATION
REGISTRAZIONE

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

- Participation in Symposium sessions
- Participation in the Active Labs
- Sardinia 2023 - Symposium Guidebook
- Digital Symposium proceedings (USB pendrive and access to the members' area)
- Conference materials
- Coffee breaks
- Admission to the welcome cocktail
- PINK Party, Prize Ceremony Sardinia Award "A Life for Waste" and other social events or social activities
- Gala Dinner (supplement to evening meal)

- *Partecipazione alle sessioni del Simposio*
- *Partecipazione agli Active Lab*
- *Programma stampato 'Sardinia 2023 - Symposium Guidebook*
- *Atti del convegno (chiavetta USB e accesso alla Members area)*
- *Materiale congressuale*
- *Coffee breaks*
- *Invito al cocktail di benvenuto*
- *Invito al PINK Party, alla cerimonia di consegna del Premio Sardinia "A life for Waste" e ad altri eventi serali e attività sociali*
- *Cena di Gala (come supplemento alla mezza pensione alberghiera)*

REGISTRATION / *REGISTRAZIONI*

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

- Sunday 8th October from 16:00 - 18:30
- Monday 9th October from 8:30 - 9:00, 10:30 - 13:00 and 15:00 - 18:30
- Tuesday 10th October - Friday 13th October from 08.30 - 13.00 and from 15.00 - 18:.30

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

- *domenica 8 Ottobre dalle 16.00 alle 18.30*
- *lunedì 9 Ottobre dalle 8:30 alle 9:00, 10:30 - 13:00 e 15:00 - 18:30*
- *da martedì 10 Ottobre a venerdì 13 Ottobre dalle 08.30 alle 13.00 e dalle 15.00 alle 18:30*

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 must contact the Speakers' Room to collect the sessions materials: our staff will provide the curricula vitae of speakers and inform of any last-minute changes in the programme.
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 the timetable is strictly respected. This aspect is of extreme importance in order to allow delegates to schedule their attendance in the parallel sessions.
Our staff member will be always available in the room for any technical assistance.

Istruzioni per i Presidenti di sessione

I Presidenti delle sessioni orali e workshop sono gentilmente pregati di contattare la Sala Relatori 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.***
Ciascuna sala sarà presidiata da un membro del nostro staff a disposizione per qualsiasi esigenza tecnica.

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 in the Speakers' Room for all requirements. Speakers who have not sent a copy of their Power Point presentation to the Organising Secretariat are kindly requested to contact the Speakers' Room

INSTRUCTIONS
ISTRUZIONI

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 useful to prepare a slide illustrating the conclusions in a summarised version.
The poster session will be held in the foyer of the congress centre. On arrival all authors should check the exact position assigned to their poster. The staff at the Registration Desk will be pleased to provide assistance.

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. La presenza di enti o ditte di appartenenza deve essere molto discreta.
Nella Sala Relatori sarà sempre presente un incaricato dell'organizzazione per fornire eventuale assistenza. Non sarà possibile utilizzare il computer della Sala 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 nella Sala 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 la Sala Relatori sarà la sera prima). I relatori dovranno assicurarsi che la presentazione sia consegnata allo staff di riferimento secondo le tempistiche indicate; non sarà possibile garantire tempo supplementare agli autori le cui presentazioni non saranno pervenute per tempo.
Durante l'esposizione orale, 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.
La sessione poster si terrà nel foyer interno del centro congressi. Gli autori sono pregati di controllare l'esatta ubicazione assegnata al proprio poster sulla mappa a disposizione nella Sala Poster. Lo staff al banco registrazioni sarà a disposizione in caso di necessità.

SYMPOSIUM APP
APP DEL SIMPOSIO

Our mobile app, powered by Whova, will allow participants to interact with speakers and delegates and to stay updated on all conference activities and news.
The app will be accessible from any device (phones, tablets and computers)
All delegates will be able to:

- view the agenda, explore sessions and build their personal schedule
- 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
- vote for the best performance during "Sardinia's got Talent" or other social activities
- view info and profile of Companies

The app will be our main tool to communicate with you!
Please download it now and check it out!

La app ufficiale del Simposio, sviluppata da Whova, consentirà a tutti i delegati di interagire con gli altri partecipanti e a rimanere aggiornati su tutte le attività del Sardinia 2023 (programma scientifico, eventi sociali, ultime notizie, ecc.).
La app sarà disponibile per tutti i dispositivi (smartphone, tablet e computer).
Attraverso la app e la piattaforma, i delegati potranno:

- *leggere tutto il programma ed esplorare le sessioni*
- *creare il proprio programma personalizzato*
- *leggere i profili e i CV degli speaker e scaricare gli articoli presentati*
- *fare network con gli altri partecipanti tramite messaggi privati, video call o chat di gruppo*
- *condividere foto e post sulla bacheca*
- *votare le esibizioni dei delegati in gara al Sardinia's Got Talent o altre attività sociali*
- *leggere i profili degli espositori*
- *ricevere aggiornamenti di programma e ultime notizie in tempo reale*

La App sarà il nostro strumento principale per tenervi aggiornati!
Si prega di scaricarla subito e di tenerla costantemente monitorata!

INSTRUCTIONS FOR DOWNLOAD

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 SARDINIA 2023

Desktop version (for computers)

The symposium app is accessible at:
https://whova.com/portal/webapp/siswm_202310/
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.

INSTRUZIONI 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 SARDINIA 2023*

Versione desktop (PC e tablet)

La piattaforma virtuale è accessibile da computer al seguente link:
https://whova.com/portal/webapp/siswm_202310/
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
PROGRAMMA SOCIALE

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. Sardinia 2023 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!

Gli eventi sociali hanno sempre avuto un ruolo cruciale nel successo del Sardinia, offrendo ai partecipanti momenti di intrattenimento in cui godere della compagnia di colleghi e amici e rilassarsi dopo un'intensa giornata di conferenza. Il Sardinia 2023 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.

SUNDAY / 8 October / h. 19:00
SARDINIAN WELCOME COCKTAIL

Get the Symposium off to a great start and meet old and new friends and colleagues in a relaxing atmosphere by the pool.

MONDAY / 9 October / h. 21:30
PINK PARTY ON THE BEACH

This year's edition is pinker than ever: in the organization, in the scientific committees and among the attendees! Let's celebrate together in a party on the beach wearing our best shade of pink!
DRESS CODE: PINK clothes or accessories!

TUESDAY / 10 October / h. 21:30
GO KART RACE: 2nd RALLY SARDINIA

The Race consists of a technical briefing, qualifyng session, a semi-final and a final session. Podium, prize ceremony with national anthem and prosecco at the end of the Race. **Limited seats! Book your place at the registration desk** (50€ + VAT 22%)

WEDNESDAY / 11 October
ACTIVITIES FOR PHYSICAL & MENTAL WELL-BEING

An evening dedicated to activities for physical & mental well-being, involving all of you, not only as participants but also as trainers!
Do you practise any disciplines or sports that you would like to teach to friends and colleagues? Please contact us at the registration desk!

Confirmed activities:

- Pilates class by Prof. Alexandre Cabral, *University of Sherbroke (CA)*
- Football match by Valentina Grossule, *University of Padova (IT)*
- Functional Training on the beach by Carlo Cossu, *University of Pretoria (ZA)*
- Padel class by Mattia Trapani, *16bit (IT)*

THURSDAY / 12 October / h. 21:30
SARDINIA'S GOT TALENT

An entertaining night in which delegates can go on stage to show their talents, accompanied by a live band which will make us dance after the talent show!
If you can sing, play an instrument, dance or have any other talent you wish to share, the stage is all yours! The symposium app will allow the audience to vote for the best performance!

Please contact us at info@sardiniasymposium.it or stop by the registration desk.
Rehearsals will be held on Thursday afternoon.

FRIDAY / 13 October / h. 19:30
GALA NIGHT

To celebrate the closure of the conference all delegates are invited to a Gala Night. The event will start at 19:30 with the **Prize Ceremony** of the **Sardinia Award "Life for Waste"** and will continue with the traditional Gala dinner.

SARDINIA AWARD
A LIFE FOR WASTE /2023

In 1999, the International Advisory Board of Symposium set up the Sardinia Award "A Life for Waste", to be presented biennially to individuals who have made an outstanding contribution to advances in international waste management research and technology.
It is our great pleasure to announce that the ex-aequo recipients of this year's "A Life for Waste" award, are Professor Yasushi Matsufuji, from Fukuoka University (JP) and Professor Toshihiko Matsuto from the Hokkaido University (JP).
The award is represented by a sculpted silver statue by the Sardinian Artist Franco De Giorgi.
The award will be delivered on **Friday 13th October 2023 at 19:30**, The Prize Ceremony will be attended by Christian Solinas, the President of the Sardinia Region and other important authorities and personalities.

Nel 1999, il Comitato Scientifico Internazionale del Simposio Sardinia ha istituito il Premio "Una Vita per i rifiuti" da consegnare ogni due anni ad una personalità scientifica di alto livello che, nel corso della sua attività, si sia distinta a livello internazionale nella ricerca sulla gestione dei rifiuti.
E' un grande piacere annunciare che i vincitori ex-aequo dell'edizione 2023 del premio "A Life for Waste" sono il prof. Yasushi Matsufuji e il prof. Toshihiko Matsuto rispettivamente dell'Università di Fukuoka e Hokkaido, Giappone.
Il premio è costituito da una statua in argento dello scultore sardo Franco de Giorgi.
*Il premio verrà consegnato **venerdi 13 ottobre alle ore 19:30**, durante una Cerimonia ufficiale alla presenza del Presidente della Regione, Christian Solinas e di altre importanti personalità politiche e scientifiche.*

2023
Yasushi MATSUFUJI
Fukuoka University (JP)

2023
Toshihiko MATSUTO
Hokkaido University (JP)

HALL OF HONOUR "A LIFE FOR WASTE" / *ALBO D'ORO DEL PREMIO "UNA VITA PER I RIFIUTI"*

2021 - *not assigned because of Covid pandemic*
2019 - Peter LECHNER (AT)
2017 - Raffaello COSSU (IT)
2015 - Werner BIDLINGMAIER / Bernd BILITEWSKI (DE)
2013 - Jean BOGNER (US)
2011 - Héctor Collazos PEÑALOZA (CO)
2009 - Rainer STEGMANN (DE)
2007 - Grahame FARQUHAR (CN)
2005 - John PACEY (US)
2003 - Robert HAM (US)
2001 - Eugenio DE FRAJA FRANGIPANE (IT)
1999 - Masataka HANASHIMA (JP)

OTHER AWARDS
ALTRI PREMI

IWWG AWARD / WASTE VISION 2100

WASTE VISION 2100 is a bi-annual IWWG award, estabilished in 2019, for young researchers in connection to the Sardinia Symposium.
The Award is addressed to early carrier researchers developing groundbreaking ideas and innovative solutions for big challenges in waste management.
The Award winner of the 3rd edition, selected by a jury consisting of members of the IWWG-MB, is **Dr. Valentina Grossule**, a researcher of the University of Padova (IT)
Ph.D. Degree in Environmental Engineering at the University of Padova (IT), she is currently working as a researcher at the same University, where she is lecturing Water and wastewater treatment course. Her research activities aim to identify low-tech cost-effective solutions in Environmental Engineering,

BEST PAPER AWARDS

Five Best Paper Awards will be assigned during the Symposium and delivered to recipients in occasion of the Gala Night.

Durante il Simposio verranno assegnati cinque premi per i migliori lavori che saranno annunciati e consegnati ai vincitori in occasione della Serata di Gala

PATRIZIA CODROMAZ AWARD / *PREMIO PATRIZIA CODROMAZ*

Award for the best paper on waste management practice. In memory of our beloved Patrizia, environmental engineer graduated at the University of Padova, manager of the plants for treatment and disposal of municipal waste at Rea Impianti.
And unforgettable member of the symposium staff.

Premio per il miglior lavoro sulle pratiche di gestione dei rifiuti. In memoria della nostra cara Patrizia, ingegnere ambientale laureata all'Università di Padova, responsabile della gestione degli impianti presso REA.
E indimenticabile membro dello staff del Sardinia.

KRITON KURI AWARD / *PREMIO KRITON KURI*

Award for the best paper on developing country waste management issues. In memory of Professor Kriton Kuri, Bogazici University, Istanbul, one of the main international experts in appropriate technologies for waste management in developing countries.

Premio per il miglior lavoro sulla gestione dei rifiuti nei paesi in via di sviluppo. In memoria del Professor Kriton Kuri, Università Bogazici di Instanbul, uno dei massimi esperti internazionali sulla gestione dei rifiuti nei paesi in via di sviluppo.

GIOVANNI BOZZINI AWARD / *PREMIO GIOVANNI BOZZINI*

Best Italian paper award. In memory of Professor Giovanni Bozzini, University of Pavia, one of the Italian pioneers in the waste management research.

Premio per il miglior lavoro italiano. In memoria del Professor Giovanni Bozzini, Università di Pavia, uno dei pionieri italiani nella ricerca sulla gestione dei rifiuti.

ALBERTO ROZZI AWARD / *PREMIO ALBERTO ROZZI*

Award for the best paper on biological treatment. In memory of Alberto Rozzi, Professor of Environmental Engineering at the Technical University of Milan, one of international leading researchers on anaerobic digestion.

Premio per il miglior lavoro sul trattamento biologico dei rifiuti. In memoria di Alberto Rozzi, professore di Ingegneria Sanitaria Ambientale al Politecnico di Milano, uno dei principali ricercatori internazionali sui processi di digestione anaerobica.

JOHN PACEY AWARD / *PREMIO JOHN PACEY*

Award for the best paper on landfill gas management. In memory of Professor John Pacey. John took part in our Symposia several times and won the "A Life for Waste Award" in 2005 for his great experience in landfill geotechnical work, with specific focus on landfill gas and lining evolutions.

Premio per il miglior lavoro sulla gestione del biogas da discarica. In memoria del Professor John Pacey, John ha partecipato a molte edizioni dei nostri Simposi e nel 2005 ha vinto il premio "A Life for Waste - Una vita per i rifiuti" per la sua straordinaria esperienza in tecnologie innovative relative allo smaltimento in discarica, in particolar modo al biogas e all'evoluzione dei sistemi di impermeabilizzazione

SUNDAY OCTOBER 8
SOCIAL EVENT

WELCOME COCKTAIL / *COCKTAIL DI BENVENUTO*

Oasis Swimming Pool, Forte Village, h. 19:00

Get the Symposium off to a great start and meet old and new friends and colleagues in a relaxing atmosphere by the Oasis swimming pool.

Per iniziare il Simposio con il piede giusto non c'é niente di meglio di un cocktail di benvenuto da sorseggiare insieme a nuovi colleghi e vecchi amici nella rilassante cornice delle piscine Oasis.

DAY 1 / MONDAY
OCTOBER 9

MONDAY OCTOBER 9
MORNING

OPENING SESSION / CENTRAL HALL / 9:00-12:30

Chair / *Presidente:* Raffaello Cossu (IT)

9:00-10:30

WELCOME ADDRESSES / *SALUTI DI BENVENUTO*

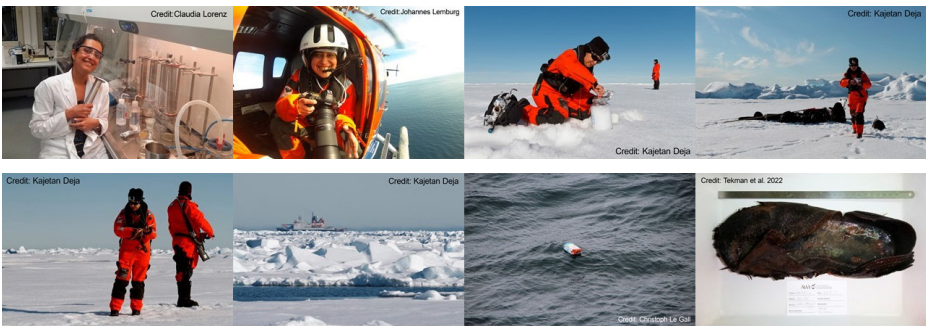
RAFFAELLO COSSU, University of Padova (IT)
MARION HUBER HUMER, BOKU University, Vienna (AT)
PINJING HE, Tongji University (CN)
JURATE KUMPIENE, Luleå University of Technology (SE)
RAINER STEGMANN, Hamburg University of Technology (DE)
WILLIAM CLARKE, IWWG President, University of Queensland (AU)
PAOLO RUSSO, Table of Rome (IT)
CHRISTIAN SOLINAS, President of the Autonomous Region of Sardinia (IT)

OPENING LECTURE / *RELAZIONE DI APERTURA*

MINE BANU TEKMAN, Özyeğin University, Istanbul (TR) / Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremen (DE)

Anthropogenic debris in the Arctic: Pollution in a region far, far away...

The Arctic is under spotlight because its physical and ecological processes are transforming fast as a reaction to climate forcing. Until recently, public perception was that plastic pollution is not an issue in polar regions, as these areas are not densely populated. This view highlights how the complexity of the problem can be underrated. A decade of research has established that polar regions are not immune to plastic pollution and this highlights that direct land-based inputs are only one part of the problem. The presence of anthropogenic debris in the Arctic highlighted the high contribution of sea-based inputs, long-distance transport and accumulation on the seafloor.



10:30 - 11:00 Coffee break

11:00-12:30

AUSTRIA "SPECIAL GUEST COUNTRY" LECTURE / RELAZIONE *AUSTRIA SPECIAL GUEST*:

Johann Fellner, TU Wien (AT)
Austria - Country information and contribution to modern strategies in waste management

INTRODUCTORY LECTURES:

Raffaello Cossu, University of Padova (IT)
Waste Management and Circular impact on Health and Environment

Rainer Stegmann, Hamburg University of Technology (DE)
The necessity for an Ecological Waste Management

Jurate Kumpiene, Lulea University of Technology (SE)
Main controversial / Hot issues in Sardinia 2023 that will be discussed in the Focus Sessions

Pinjing He, Tongji University (CN)
Waste & Emerging contaminants

Marion Huber-Humer, BOKU University, Vienna (AT)
Presentation of IWWG 20100 Vision Award and 2023 Winner

MONDAY OCTOBER 9
AFTERNOON

SESSION A1 / CENTRAL HALL / 15:00-16:30
STRATEGIES & POLICIES IN WASTE MANAGEMENT

Chair / *Presidente:* Ian D. Williams (UK)

M. Struk, J. Soukopovà, A. Chroustovà (CZ)
Intermunicipal cooperation in waste management provision - Factors causing inefficiencies

D. Gamble, S. Mason-Jones (AU)
Challenges in delivering essential waste infrastructure in NSW, Australia

T. Nigl, J. Scheiblauer, T. Bouvier-Schwarz (AT)
Energy transition and renewable energies in waste management and circular economy – Potentials and obstacles in reducing energy dependency

A. Allesch, B. Beigl (AT)
Development of a deposit system for beverages – Obstacles and challenges

16:30 - 17:00 Coffee break + Poster discussion

SESSION A2 / CENTRAL HALL / 17:00-18:30
TEXTILE WASTE: RECYCLING CHALLENGES WITH REGARDS TO COMPOSITION & CONTAMINANTS

Chair / *Presidente:* Andreas Bartl (AT)

P. Kählig, W. Ipsmiller, A. Bartl, J. Lederer (AT)
Composition of textile waste in Vienna

U. Jenull, I. Duretek, T. Lucyshyn, C. Holzer (AT)
Material characterisation of industrial textile waste under consideration of various contaminants

A. Shtukaturova, M. Syc, T. Cajthaml (CZ)
Assessment of the presence of hazardous components in textile wastes

H. Logan, V. Rossi, A. Damgaard (DK)
Collection, sorting and recycling of textile. It is not only about the fiber types

SESSION B1 / CENTRAL HALL 2 / 15:00-16:30

LCA IN WASTE MANAGEMENT I

Chair / *Presidente:* Valentina Bisinella (DK)

T.H. Christensen, S. Schmidt, D. Laner, A.S. Varling, V. Bisinella (DK)
Future challenges in waste LCA

S. Schmidt, D. Laner (DE)
Environmental waste utilization: an LCA-based indicator for waste management systems

A. Nabavi-Pelesaraei, V. Bisinella, A. Damgaard (DK)
Life cycle assessment of the dominant scenarios of waste management system in the north of Iran

A.S. Varling, T.H. Christensen, V. Bisinella (DK)
Life cycle assessment of alternative biogas utilisations, including carbon capture and storage or utilisation

J. Jacobsen (DK)
Life cycle assessment of developing recycling technologies of complex plastic products

16:30 - 17:00 Coffee break + Poster discussion

SESSION B2 / CENTRAL HALL 2 / 17:00-18:30

WASTE MANAGEMENT AND ECOLOGY

Chair / *Presidente:* Kerstin Kuchta (DE)

R. Stegmann (DE)
How to achieve ecological Waste Management?

L. Schebek, J. Baehr, T. Hagedorn, A. do Carmo Precci Lopes, V. Zeller (DE)
Waste management in the context of the Green Deal - General framework, policy instruments and ongoing developments

M. Suchowska-Kisielewicz, A. Jędrczak (PL)
Analysis of different waste management scenarios for improving nitrogen flows in urban areas

E. Jung, V. S. Rotter, C. Kirsten, J. Mühlenberg, A. Krause (DE)
Dry toilets offer a sustainable solution for communal waste management and regional economies by enabling nutrient recycling

MONDAY OCTOBER 9
AFTERNOON

SESSION C1 / PANORAMA HALL / 15:00-16:30
MANAGEMENT OF UNCONVENTIONAL WASTE

Chair / *Presidente:* Cristina Trois (ZA)

P.K. Dagadu, G. Sagoe, M. Oteng-Ababio (GH)
Household hazardous waste: gauging the knowledge level and its implication for domestic handling and disposal practices

K. Mphahlele, R.H. Matjie, J.R. Bunt (ZA)
Chemical, mineralogical, physical and petrographic properties and reactivity of two South African fine coal refuse and their beneficiated fractions

M. Pettersson, O. Johansson (SE)
Mining waste as a resource in the green transition: legal conditions for secondary extraction

T. Gisbert (FR)
Dealing with unexpected waste during the implementation of civil works: a case study highlighting technical, legal & safety aspects

K. Manabe, T. Shimaoka, S. Iwashita (JP)
Disaster waste management in response to disaster scale

16:30 - 17:00 Coffee break + Poster discussion

SESSION C2 / PANORAMA HALL / 17:00-18:30
COMPOSTING: STRATEGIES & PRE-TREATMENT

Chair / *Presidente:* Sebastian Schmuck (DE)

A. Garcia-Randez, V. Blay, J. Andreu, M.D. Pérez-Murcia, C. Alvaro, M.A. Bustamante, E. Martinez-Sabater, L. Orden, S. Sanchez, R. Moral (ES)
Developing new composting approaches using non-sorted biowaste compost as ingredient to obtain improved EU biofertilizers

V. Scheff, G. Dürl, D. Laner (DE)
Composition, characterization and mechanical processing of compost oversize material from biowaste treatment plants

E. Binner, P. Behnisch, C. Zafiu, M. Huber-Humer (AT)
Sanitisation of faeces by composting according to Austrian state of the art

D. Xie, K. Zheng, H. Wang (CN)
Reusing nitrate-rich wastewater as a moisture conditioning agent during composting increases total nitrogen content of compost product by increasing nitrate

SESSION D1 / EX CHIESA HALL / 15:00-16:30

WASTE GENERATION & CHARACTERIZATION

Chair / *Presidente:* Deborah Panepinto (IT)

L. Izquierdo-Horna, R. Kahhat, I. Vázquez-Rowe (PE)
Identification of variables related to household solid waste generation forecasting in residential areas

P. Beigl, A. Happenhofer, R. Ottner, S. Salhofer (AT)
Modelling commercial waste generation as share of municipal residual waste collection

G. Ferrari, R. Ferrari, L. Ianelli (IT)
Technical-analytical procedures for the verification of the quality of waste management services in a metropolitan city: the experience of Roma Capitale

Y. Qi, H. Zhang, P. He, F. Lü, D. Lan, H. Xian (CN)
New ideas for smart waste management: machine learning assisted rapid identification of characteristics of Municipal Solid Waste (MSW)

A. Ramos (PT)
Considerations on waste characterization and the production of energy: how useful can waste be?

M. Sharkey, D. Drage, W. Stubbings, M. Coggins, H. Berresheim, S. Harrad (IE)
Persistent organic chemicals in the Irish waste stream

16:30 - 17:00 Coffee break + Poster discussion

SESSION D2 / EX CHIESA HALL / 17:00-18:30

SEPARATE WASTE COLLECTION

Chair / *Presidente:* Stefan Salhofer (AT)

P. Beigl, A. Happenhofer (AT)
Developing robust KPIs for waste collection and composition: lessons learned from residual, paper and biogenic waste composition analyses

H. Yamakawa (JP)
Municipal policies for promoting household plastic recycling in Japan

P. Rodrigues, R. Rodrigues, F. David, N. Melo, E. Soares (PT)
Food waste collection versus food waste disposers: the case study of a Portuguese city

J. Liu, K. Zhou (CN)
Optimization of MSW management system based on source separation in megacities of China

MONDAY OCTOBER 9
AFTERNOON

SESSION E1 / BIANCA HALL FOYER / 15:00-16:30
LANDFILL PROCESSES MODELLING & SIMULATION

Chair / *Presidente:* Julia Gebert (NL)

N. Quist, F. van Raffe, R.N.J. Comans (NL)
Three landfills, six treatments, sixteen landfill simulation reactors

C.F. Andrade, A.-C. Dieudonne, J. Gebert, T. Heimovaara (NL)
Mechanisms governing carbon and nitrogen pathways during enhanced waste degradation in landfill simulator reactors

K. Knox (UK)
Simulation of complex leachate generation patterns using an updated empirical method

K. Ishii, M. Narita, S. Ochiai, G. Ham (JP)
A three-dimensional numerical model to predict future leachate generation in landfill sites under climate change

N. Meza, T. Heimovaara, T. Kanen, J. Gebert (NL)
Comparing modelled, recovered and generated gas in a MSW landfill under leachate recirculation

16:30 - 17:00 Coffee break + Poster discussion

SESSION E2 / BIANCA HALL FOYER / 17:00-18:30
LANDFILL GAS EXTRACTION & UTILIZATION

Chair / *Presidente:* Robert Gregory (UK)

M. Giovannetti, G. Cordaro (IT)
Automated control system for biogas extraction

T. Malmir, D. Lagos, M. Héroux, U. Eicker (CA)
Assessment of landfill gas storage and application regarding energy management: a case study in the province of Quebec, Canada

S. Jennings (US)
Using landfill gas as a source of electricity instead of a source of pollution

G. Barina, T. Denoun, O. Belkacemi, A. Trueba, M. Venturini, E. Trottini (FR)
The upgrading of a variable quality landfill biogas to biomethane - Feedback from the operation of several upgrading units

P. Wens, E. Wille (BE)
H2 injection in organic landfills for production of green natural gas

SESSION F1 / NATURISTA HALL / 15:00-16:30

STRATEGIE E PRASSI NELLA GESTIONE DEI RIFIUTI

Chair / *Presidente:* Fabio Tatano (IT)

G. De Feo, C. Carotenuto, A. Grosso (IT)
Analisi dei flussi di massa dei rifiuti urbani nelle regioni italiane

C. Ratti, B.J. Lotesoriere, C. Bax, L. Capelli (IT)
Verso il monitoraggio in tempo reale delle emissioni odorigene dagli impianti di trattamento rifiuti: un caso studio

G. De Feo (IT)
Come un innovativo programma di educazione ambientale può aiutare il settore della gestione dei rifiuti

F. Girardi, G. Ferrari (IT)
La gestione della frazione organica dei rifiuti urbani tra riduzione e recupero di materia: l'esperienza dell'ASA di Tivoli

16:30 - 17:00 Coffee break + Poster discussion

SESSION F2 / NATURISTA HALL / 17:00-18:30

RIFIUTI ORGANICI E TRATTAMENTI BIOLOGICI

Chair / *Presidente:* Giovanni De Feo (IT)

L. Preite, G.P.C. Tancredi, A. Paini, G. Vignali (IT)
Sviluppo di un modello di simulazione per condurre uno studio di fattibilità di un processo di valorizzazione di scarti alimentari

M. Miccio (IT)
Recupero di sostanze bioattive dai residui agroindustriali della nocciola seguendo un approccio ingegneristico

G. Campo, D. Panepinto, V.A. Riggio, A. Cerutti, M. Ravina, M. Zanetti (IT)
Scarti della tostatura del caffè, due tecnologie a confronto: digestione anaerobica e combustione diretta. Un caso studio

A. Folino, A. Randazzo, F. Tassi, F. Tatàno, S. de Rosa, A. Gambioli (IT)
Bioenergia da frazione organica verde mediante digestione anaerobica a scala di laboratorio: caratterizzazione in condizioni termofile e mesofile

G. Barulli, G. Ferrari (IT)
Proseguimento dello studio sull'utilizzo in agricoltura biologica del compost di qualità nella Repubblica di San Marino

MONDAY OCTOBER 9
AFTERNOON

SESSION G1 / PINETA HALL / 15:00-16:30

WORKSHOP: ORGANIC WASTE FRACTIONS: CALL FOR PARTNERS IN EU PROJECTS PROPOSALS

Chairs / *Presidenti:* Renata Tomczak-Wandzel, Beata Szatkowska (NO)

Introductory lectures:

R. Tomczak-Wandzel, B. Szatkowska (NO)
Safe and sustainable treatment and utilisation of organic waste fractions generated at urban scale in the light of circular economy - SafeWaste2Resource

R. Tomczak-Wandzel, B. Szatkowska (NO)
Anaerobic digestion of food waste containing bioplastics as technology for recovering of safe fertilizer

17:10 - 18:00 Coffee break + Poster discussion

SESSION G2 / PINETA HALL / 17:00-18:30

WORKSHOP: WASTE ARCHITECTURE

Chair / *Presidente:* Ian Williams (UK)

Introductory lectures:

S. Ripley, I.D. Williams (UK)
Critical analysis of processing architectural salvage through reclamation yards

E.A. Diamantouli, F. Chatzopoulou, L. Stendardo (IT)
(Techno-) geographies of waste: tools of rising awareness on waste culture and landscape aesthetics

E. Daskalova, I.D. Williams (UK)
Architectural salvage vs Modern construction: Investigation into sustainability and aesthetic values

ACTIVE LAB 01+02 / FOYER CONGRESS CENTRE / 15:00-18:30

BLACK SOLDIER FLY LARVAE: A FULL WEEK TEST FOR BIOWASTE TREATMENT

PART 1: REACTORS SET UP AND STARTING OPERATION

Organised by / *Organizzato da:*
Marco Meneguz - BEF Biosystem (IT);
Valentina Grossule - University of Padova (IT)

In the context of the Circular Economy, the use of Black Soldiers Fly (BSF) for biowaste treatment represents a promising alternative to conventional biological processes, for either managing the waste and providing high value resources in term of materials and energy. Indeed, in the larval stage BSF are capable of metabolising and stabilising huge amounts of putrescible waste, transforming it into valuable biomass rich of proteins and fats, suitable for the direct use as animal food or for production of biorefinery products, such as proteins and, biodiesel, lubricants, chitin and chitosan, antimicrobial peptides.
The active lab aims at providing basics knowledge of the BSF larvae and on their use for biowaste treatment, including designing, feed quality, control parameters etc.
Practical activities will be divided into two parts:

- PART 1: set up of small-scale reactors for treatment of different biowaste, at the beginning of the conference. The reactors will be kept in operation and can be visited throughout the whole conference (Monday 9 October, 15:00 - 18:30)
- PART2: closure of the test at the end of the conference with larvae separation and performance assessment (Friday 13 October, 9:00 - 12:30)

MONDAY OCTOBER 9
SOCIAL EVENT

PARTY ON THE BEACH: "50 SHADES OF PINK!"

Terrazza San Domenico, Giardino Acquatica, Forte Village, h. 21:30

This year's edition is pinker than ever: in the organization, in the scientific committees, in the symposium staff and in the attendees!
Let's celebrate together in a party on the beach wearing our best shade of pink!
Cocktails and dance music will be provided to celebrate the beginning of the conference week!

DRESS CODE: PINK clothes or accessories!

Free event for symposium delegates and accompanying persons.

DAY 2 / TUESDAY
OCTOBER 10

TUESDAY OCTOBER 10
MORNING

SESSION A3 / CENTRAL HALL / 9:00-10:30
CIRCULAR ECONOMY IN EU: HOW FAR FROM RECYCLING TARGETS

Chair / *Presidente:* Maria Pettersson (SE)

A. Reichel, I. Bakas, S. Colgan, E. Dils, T. Duhoux, A. van der Linden, D. Nelen, I. Vanderreydt, A. Winterstetter, M. zu Castell-Rüdenhausen, H. Punkkinen, P. Slotte (DK)
Municipal waste management - Is the EU meeting its recycling targets?

A. Reichel, I. Bakas, B. Vidal, M. Christis, A. Vercalsteren, P. Nuss, R. Marra Campale, S. Steger (DK)
Is the EU on track to double its circular material use rate?

W. Ipsmiller, P. Kählig, A. Bartl (AT)
Textile recycling: Are we halfway through yet?

S. Hodgson, K. Frenken, L. Piscicelli, I. Williams (NL)
Circularity failure and opportunities for innovation in services: the case of the hairdressing industry

S. Salhofer (AT)
Closing material cycles – The global dimension of plastic recycling

10:30 - 11:00 Coffee break

SESSION A4 / CENTRAL HALL / 11:00-12:30
CRITICAL ISSUES AND RISKS IN CIRCULAR ECONOMY

Chair / *Presidente:* Marion Huber-Humer (AT)

R. Moral, J. Sáez-Tovar, F. Salinas, J.P. Barranco, J.A. N. Barbani, S. Verstichel, A. Al-saadi, P. Cinelli, MJ. Lopez (ES)
RECOVER project: Biotech synergies to solve plastic recycling and contamination challenges

M. Ferrante, G. Oliveri Conti, P. Rapisarda (IT)
The plastic wastes: an unresolved problem of management of European wastes

P. Hennebert, A. Navazas (BE)
Hazardous waste should be managed by risk in the controlled industrial loops of the modern circular economy, as products

N. Van Camp, I.S. Lase, S. De Meester, S. Hoozée, K. Ragaert (BE)
Cost analysis and exploration of plastics mechanical recycling

T. Nigl, I. Mostböck (AT)
Fire incidents in waste management and circular economy - The results of long-term monitoring and benefits of improved risk management

SESSION B3 / CENTRAL HALL 2 / 9:00-10:30

ARTIFICIAL INTELLIGENCE IN WASTE MANAGEMENT

Chair / *Presidente:* Wei Peng (CN)

A. Salih (AU)
Utilising ChatGPT in waste management

T. Lange, P. Meyer, M. Keppner, T. Tiedemann, M. Wittmaier, S. Wolff, T. Vögele (DE)
First lessons learned of an Artificial Intelligence robotic system for autonomous coarse waste recycling using multispectral imaging-based methods

K. Khodier, A.L. Krabichler-Mark, I. Werner, A. Rizvan, Y. Varsh (AT)
Efficient calibration of discrete-element-method simulations for waste applications using particle sensor data and artificial intelligence

M. Eriksson, A. Sjölund, E. Svensson, C. Malefors (SE)
Development of digital know as you throw tools for household food waste reduction

A.N. David, Y. Sewsynker-Sukai, E.B. Gueguim Kana (ZA)
Complete valorization of lignocellulosic and industrial wastes for lactic acid production: process optimization, Kinetic assessment and Artificial intelligence modelling

10:30 - 11:00 Coffee break

SESSION B4 / CENTRAL HALL 2 / 11:00-12:30

ARTIFICIAL INTELLIGENCE IN WASTE TREATMENT MONITONING

Chair / *Presidente:* Pinjing He (CN)

L. Kandlbauer, R. Sarc (AT)
Opportunities from sensory retrofitting in mechanical waste treatment plants - Real time quality determination via digital material flow monitoring

G. Hafner (DE)
Monitoring and reduction of food waste by using the RMFood-App - Project A2UFood (Heraklion)

C. Ratti, C. Bax, B.J. Lotesoriere, L. Capelli (IT)
Towards real-time monitoring of odour emissions from waste treatment plants: a case study

W. Peng, L. Fan, H. Zhang, H. Y. Xian, F. Lü, P. J. He (CN)
Analysis of biochemical composition and detection of physical contaminants in digestate using hyperspectral imaging

TUESDAY OCTOBER 10
MORNING

SESSION C3 / PANORAMA HALL / 9:00-10:30
COMPOSTING: PROCESSES & EMISSIONS

Chair / *Presidente:* Raùl Moral-Herrero (ES)

D. Li, M.K. Manu, J.W.C. Wong (HK)
Synergetic effect of combined biochar and nitrifying inoculum on nitrogen conservation during food waste digestate composting

A.M. Fredenslund, M. Edjabu., C. Scheutz (DK)
Methane and nitrous oxide emission factors for windrow composting of garden waste in Denmark based on ground-based remote sensing measurements

Y. Wang, H. Zhang, F. Lü, P. He (CN)
Odor characteristics and health risks of gas emissions during solid waste biotreatment and landfilling

K. Sobieraj, D. Derkacz, A. Krasowska, A. Białowiec (PL)
Bacillus bacteria as carbon monoxide producers during composting: lab-scale evaluation

10:30 - 11:00 Coffee break

SESSION C4 / PANORAMA HALL / 11:00-12:30
ANAEROBIC DIGESTION: PROCESSES & BIOGAS PRODUCTION

Chair / *Presidente:* Sebastian Schmuck (DE)

A. Kasinath, W. Artichowicz, H. Byliński, A. Remiszewska-Skwarek, M. Szopińska, E. Zaborowska, A. Luczkiewicz, S. Fudala-Ksiazek (PL)
Intensified methane content in biogas by low-thermal processing of waste activated sludge

O. Larsen, M. Spahr, M. Fechter, T.-L. Vu-Han, L. Fechter, V. Rotter (DE)
The loop fermenter - Demonstration of a novel biogas process for residual lignocellulosic biomass

A. Folino, A. Randazzo, F. Tassi, F. Tatàno, S. de Rosa, A. Gambioli (IT)
Lab-scale characterisation of bioenergy potential from green waste through anaerobic digestion: thermophilic versus mesophilic conditions

L. Luo, J.W.C. Wong (HK)
New insight into autogenic pressure on solid-state food waste fermentation

M. Carchesio, M. Di Addario, F. Tatàno, S. de Rosa, A. Gambioli (IT)
Biochemical methane potential of biostabilised organic waste destined for landfilling: evaluation under mesophilic and thermophilic conditions

R. Tomczak-Wandzel, B. Szatkowska (NO)
Bioplastics influence on anaerobic digestion of organic fraction of municipal waste (OFMSW)

SESSION D3 / EX CHIESA HALL / 9:00-10:30

COMBUSTION TECHNOLOGIES: STRATEGIES & ADVANCED ISSUES

Chair / *Presidente:* Lidia Lombardi (IT)

M.J. Enengel, S.A. Viczek, R. Sarc (AT)
Reaching EU recycling targets: influence on SRF quality

D. Panepinto, M. Zanetti (IT)
Overview on pollution control technologies in waste combustion plants: analysis on the environmental aspects

V. Scheff, G. Dürl, H. Ali Raza, K. Kätzl, D. Laner (DE)
Efficient thermal utilization of compost oversize material: processing steps for the improvement of fuel quality and combustion behavior

T. Rashwan, T. Fournie, M. Zanoni, C. Switzer, J. Torero, G. Grant, J. Gerhard (UK)
Recent insights into the use of smouldering combustion for waste management

V. Bisinella, A.S. Varling, T.H. Christensen (DK)
Scenarios for waste incineration in a regional waste management system for Europe

10:30 - 11:00 Coffee break

SESSION D4 / EX CHIESA HALL / 11:00-12:30

PYROLYSIS: PROCESSES & PERFORMANCE

Chair / *Presidente:* Apostolos Giannis (GR)

C. Eden, R. Eden (UK)
Pyrolysis - An Integral Link in the Circular Economy

M. Wang, X. Song, T. Jia, L. Yin, D. Chen, X. Ma (CN)
Effect of plastic melting on pyrolysis process of biomass in bubbling bed

A. Serras Malillos, S.D. Stefanidis, S. Karakoulia, A.A. Lappas, A. Lopez-Uriona-barrenechea, E. Acha, B.M. Caballero (ES)
Ex-situ thermo-catalytic upgrading of pyrolysis volatiles from end-of-life (EoL) fibre reinforced polymer (FRP) waste: catalyst screening study on a fixed bed reactor

D.Y. Chae, J.K. Kim, K.B. Park, J.S. Kim (KR)
Pyrolysis and oxidative pyrolysis of palm kernel shells using a continuous two-stage pyrolysis process for the production of phenol-rich oil: the effect of the reaction temperature and the concentration of oxygen in fluidizing medium

Y. Zang, D. Chen, S. Ge, L. Yin (CN)
Prediction of MSW pyrolysis products based on deep artificial neural networks

TUESDAY OCTOBER 10
MORNING

SESSION E3 / BIANCA HALL FOYER / 9:00-10:30
LANDFILL METHANE OXIDATION SYSTEMS

Chair / *Presidente:* Alaxandre Cabral (CA)

C. Scheutz, Z. Duan, P. Kjeldsen (DK)
The Danish Biocover Initiative - Background, monitoring and status

C. Scheutz, Z. Duan, P. Kjeldsen (DK)
The Danish Biocover Initiative - Case studies

J.L. Almeida, J. Dumouchel, J.J. das Neves Santos, R. Sellez, Y. Dulac, A. Cabral (CA)
Large-scale pilot biofilter to abate methane emissions from a depleted landfill gas

Z.L. Kanmacher, R.G. Zytner, E. Short, A. Yochim, R. Vaillancourt, D. Lake, B.R. Nelson., Y. Dulac, A. Cabral (CA)
Resilience of a methane oxidation biosystem treating residual methane emissions from a closed landfill

Y. Dulac, Z.L. Kanmacher, R.G. Zytner, A. Yochim, R. Vaillancourt, D. Lake, B.R. Nelson, A. Cabral (CA)
Validation of a methane oxidation biosystem design method

10:40 - 11:00 Coffee break

SESSION E4 / BIANCA HALL FOYER / 11:00-12:30
SEMI-AEROBIC LANDFILL AND AERATION

Chair / *Presidente:* Marco Ritzkowski (DE)

P. Bonilla Prado, C. Scheutz, N.S. Jensen, L. Fjelsted, J.E. Larsen, A.G. Christensen, R.R. Møller, P. Kjeldsen (DK)
Landfill aeration as a technology to reduce the length of the aftercare period at AV Miljø Landfill, Denmark – Results of an initial pilot-scale aeration test

C.R. Cruz, H. Lammen (NL)
Landfill stabilisation by enhanced aeration lessons learned and optimisation of the aeration

S. Toyohisa, N. Fujiwara, A. Morioka, S. Nagano, S. Higuchi, K. Sato (JP)
Effectiveness of sheet capping on semi-aerobic functioning at a landfill site in Japan

H. Yoshida, A. Ito (JP)
Simulation of landfill gas flow around a gas monitoring well in a closed landfill

P.V. Queiroz Sousa, P. Cardoso (MZ)
The impact of "Fukuoka Method" based semi-aerobic landfill technology on existing dumpsites: the case of Hulene landfill in Maputo, Mozambique

SESSION F3 / NATURISTA HALL / 9:00-10:30

RECUPERO DI MATERIALI ED ENERGIA DAI RIFIUTI

Chair / *Presidente:* Giovanna Cappai (IT)

L. Moreschi, M. Gallo, A. Del Borghi, G. Perotto, E. Gagliano (IT)
Valorizzazione dei rifiuti organici nella produzione di imballaggi in plastica in una prospettiva di economia circolare: valutazione dell'impatto ambientale nel ciclo di vita

M. Tammaro, L. M. Cafiero, L. Tuccinardi, R. Tuffi (IT)
Impianto prototipale per il riciclo di rifiuti costituiti da pannelli fotovoltaici a fine vita, basato su un processo brevettato a basso impato ambientale

O. Yazoghli-Marzouk, Z. Jaouadi, G. Di Mino, I. Srour, A. Kraiem (FR)
L'approccio del progetto RE-MED all'implementazione dell'economia circolare nel settore delle costruzioni stradali riciclando i rifiuti di costruzione e demolizione e l'asfalto rigenerato

L. Acampora, G. Costa, F. Lombardi, C. Mensi, I. Verginelli (IT)
Proposta di una procedura multilivello basata sull'analisi di rischio per valutare la compatibilità ambientale dell'utilizzo di frazioni minerali dal trattamento di ceneri di fondo da termovalorizzazione di rifiuti

A. Di Biase, A. Quarta, P. Corvaglia, M. Malavasi, G. Di Salvia (IT)
Tecnologia Flameless Pressurized Oxy-combustion (FPO): si avvicina alla fase di industrializzazione la nuova frontiera per la chiusura sostenibile del ciclo dei rifiuti

10:30 - 11:00 Coffee break

SESSION F4 / NATURISTA HALL / 11:00-12:30

DISCARICHE E SINK SOSTENIBILI PER I RIFIUTI RESIDUI

Chairs / *Presidente:* Quintilio Napoleoni (IT)

M. Giovannetti. M. Cordaro (IT)
Sistema di controllo automatizzato per la captazione del biogas di discarica

M. Coldesina, R. Casazza (IT)
Soluzione flessibile ed economica, con applicazione reale, per il monitoraggio di una discarica

G. Preda, F. Crociati, M. Neri, L. Savigni, E. Bosi (IT)
Il ruolo della evoluzione normativa sulla riduzione della produzione di percolato nelle discariche in post-gestione

G. Viti, A. Randazzo, S. Venturi, F. Tatàno, F. Tassi (IT)
Attenuazione di composti inorganici e organici volatili da suoli di copertura di discarica trattati con fanghi di depurazione e percolato di discarica

TUESDAY OCTOBER 10
MORNING

SESSION G3 / PINETA HALL / 9:00-10:30

WORKSHOP: WASTE CHARACTERIZATION PRACTICES IN AFFLUENT & DEVELOPING COUNTRIES I

Chair / *Presidente:* Johann Fellner (AT)

Waste characterization studies (e.g. sorting analysis of waste) in affluent countries are more or less a standardized procedure giving reproducible and representative results. In many emerging and developing countries however, the procedure of waste characterization studies including their planning (sampling) is hardly documented and very often does not following good guidance. Hence, the aim of the workshop is to discuss the current practice of waste characterization studies in different African countries (e.g. Egypt, Zambia, Uganda) and to compare their procedure with the prevailing practice applied in Europe.

Introductory lectures:

J. Fellner (AT)
Introduction into the workshop

P. Beigl (AT)
Austrian guideline for analysing the composition of mixed MSW

D. Blasenbauer (AT)
Waste sampling for characterizing sorting processes

10:30 - 11:00 Coffee break

SESSION G4 / PINETA HALL / 11:00-12:30

WORKSHOP: WASTE CHARACTERIZATION PRACTICES IN AFFLUENT & DEVELOPING COUNTRIES II

Chair / *Presidente:* Johann Fellner (AT)

In session G4 the discussion started in G3 will be continued.

Introductory lectures:

A. Gaber (EG)
Waste characterization practice in Egypt

A. Komakech (UG)
Waste characterization practice in Uganda

B.G. Mutono-Mwanza, L. Haabazoka (ZM)
Waste characterization practice in Zambia

ACTIVE LAB 03+04 / FOYER CONGRESS CENTRE / 9:00-12:30

PLASMA APPLICATION FOR THE REMOVAL OF EMERGING CONTAMINANTS AND MICROPOLLUTANTS FROM WATER

Organised by / *Organizzato da:*

Mubbshir Saleem - University of Padua (IT)

Kubra Altuntas - Istanbul Technical University (TR)

Theoretical approach

1. Diagnostics

- Plasma typologies
- Equipment needed (power supplies, high voltage and current probes, oscilloscope)
- Power determination

2. Treatment

- Introduction to plasma reactors
- Selection of the type of plasma based on the type contaminants; the case of surfactant and non-surfactant contaminants

3. Analysis

- Equipment needed for chemical analyses and challenges; the case of PFAS Determination of process kinetics
- Calculation of energy efficiency of plasma treatment and comparison with Advanced Oxidation Processes (AOPs)

Practical activities

Practical demonstrations of types of plasma discharges (Corona, Streamer, Radial discharge and DBD Barriers), using different types of power supplies, by means of small-scale prototypes. Treatment of artificial wastewaters will be tested shown, selecting appropriate plasma typology according to the target contaminant (e.g. industrial dye, surfactants).

Safety details:
Plasma reactors will be constructed keeping in view the safety of the user and the participants. Similarly lower input power will be utilized to operate the plasma devices as low as 5 W. Chemicals including household detergent to represent surfactants and methylene blue to represent a on surfactant industrial dye will be used to show the efficiency of plasma treatment. The disappearance of foam in the case of detergent and color in the case of industrial dye will demonstrate the robustness of the plasma application for micropollutant removal.

10:30 - 11:00 Coffee break

TUESDAY OCTOBER 10
AFTERNOON

SESSION A5 / CENTRAL HALL / 15:00-16:30
WASTE SORTING PERFORMANCE
Chair / *Presidente:* Jurate Kumpiene (SE)

H. Mendez (DE)
The potential of sorting municipal solid waste before landfilling or incineration

T. Lasch, K. Khodier, C. Feyerer, R. Sarc (AT)
Development of an assessment method for unambiguous validation of machine performance

C. Feyerer, K. Khodier, T. Lasch, R. Sarc (AT)
Possibilities for indirect measurement of throughout performance in solid waste shredding

J. Aberger, K. Khodier, R. Sarc (AT)
RecAIcle: supporting manual sorting workers with Artificial Intelligence and Machine Learning - Framework and training data acquisition

16:30 - 17:00 Coffee break + Poster discussion

SESSION B5 / CENTRAL HALL 2 / 15:00-16:30
LCA IN WASTE MANAGEMENT II
Chair / *Presidente:* Thomas H. Christensen (DK)

B. Staley, S. Boxman (US)
Life Cycle Assessment of curbside material recovery

K. Czerwińska, S. Del Pero, L. Lombardi, A. Polettini, R. Pomi, A. Rossi, S. Shivali, M. Śliz, M. Wilk, T. Zonfa (IT)
Life Cycle Assessment of two alternative biorefinery processes

H. Logan, J. L. Hermary, A. Damgaard (DK)
LCA of recycling of textiles in a circularity context 3 How much of the textile production value chain impact is avoided?

M. Doostdar, J. zum Brock, A. Ceraso, A. Morales Rapallo, K. Kuchta (DE)
Comparative life cycle assessment of different recycled concrete aggregates

16:30 - 17:00 Coffee break + Poster discussion

SESSION C5 / PANORAMA HALL / 15:00-16:30

BIOREFINERY PROCESSES

Chair / *Presidente:* Vesna Zepic Bogataj (SI)

G. Farabegoli, A. Marrapodi, F. Minniti, F. Tatti, G. Costa, L. Lombardi, A. Polettini, R. Pomi, A. Rossi (IT)
BBCircle - Assessment of a new circularity index

W. Huo, R. Ye, Y. Shao, M. Bao, R. Stegmann, W. Lu (CN)
Enhance ethanol-driven carboxylate chain elongation by Pt@C in simulated sequencing batch reactors: process and mechanism

I. Kontogeorgos, H. Byliński, M. Szopińska, V. Shankar, A. Luczkiewicz, S. Fudala-Ksiazek (PL)
Low-thermal pretreatment of food waste substrate prior to fermentation for medium chain carboxylic acids production

F. Lü, Z. Wang, Y. Liu, J. Guo, P. He (CN)
Recovery of high-value products from liquid digestate beyond biogas and humus

F. Pasciucco, E. Rossi, I. Pecorini (IT)
Environmental evaluation of a novel biorefinery configuration for the recovery of biopolymers (PHA): a Life Cycle Assessment

G. Campo, D. Panepinto, V.A. Riggio, A. Cerutti, M. Ravina, M. Zanetti (IT)
Coffee roasting byproducts. Two technologies compared: anaerobic digestion and direct combustion. A case study

M. Materazzi, H. Zhu, M. Babkoor, A. Cavaliere, M.-O. Coppens (UK)
Waste to Olefins: experimental review of new chemical recycling concepts

16:30 - 17:00 Coffee break + Poster discussion

TUESDAY OCTOBER 10
AFTERNOON

SESSION D5 / EX CHIESA HALL / 15:00-16:30
WASTE MANAGEMENT IN DEVELOPING COUNTRIES

Chair / *Presidente:* Camila Camolesi Guimarães (BR)

J. Gutberlet, I. de Carvalho Vallin (CA)
Waste picker rights and social inclusion: the creation of a university with knowledge democracy

P.J. Shaw, J.A. Wright, M.L.H. Thomas-Possee, A.G. Hill, J. Okotto-Okotto, L. Okotto, M. Dzodzomenyo (UK)
Using nationally representative household surveys to estimate waste arisings in developing and low-income countries

P. Subrata, I.M. Rafizul, M. Alamgir, S.K. Sarkar, E. Kraft, G. Biastoch, S. Setu, J.A. Saju, A.A. Noman (BD)
Role of SCIP plastics project to mitigate plastic pollution in Khulna region of Bangladesh

S. Berner, S. Setu, H.M. Nahid, E. Kraft, I.M. Rafizul (DE)
Quantifying plastic emissions to assess the environmental impact of open landfill sites

N. Mahdjoub, A. Rampersad, C. Trois (ZA)
The state of the waste tyre recycling industry in South Africa, post Covid-19, within a circular economy framework

16:30 - 17:00 Coffee break + Poster discussion

SESSION E5 / BIANCA HALL FOYER / 15:00-16:30

LANDFILL AERATION SPECIFIC ASPECTS

Chair / *Presidente:* Nicole Berge (US)

J. Gebert, N. Meza, C. Cruz, H. Lammen (NL)
Assessing the efficiency of landfill aeration with a carbon mass balance approach

S.C. Yi, N. Meza, H. Oonk, J. Gebert (NL)
Understanding nitrogen transformation using the ratio of nitrogen to argon in landfills under in-situ stabilisation

L. Duarte Campos, T. Rees-White, R. Beaven, C. Cruz, H. Lammen, J. Gebert (NL)
Pressure field tests to infer permeability of waste bodies under in situ aeration

W. Yu, P. Jin, S. Bian, J. Yang (CN)
Insights into leachate reduction in landfill with different ventilation rates: balance of water, waste physicochemical properties and microbial community

16:30 - 17:00 Coffee break + Poster discussion

SESSION F5 / NATURISTA HALL / 15:00-16:30

WORKSHOP: WASTE AND HEALTH

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

Introductory lectures:

N. Fraeyman, S. Malfait, V. Duprez , L. Hens, E. Mortier (BE)
On the complexity of the relation between the environment and human health

A.S.N. Ndiforngu, M.C. Lavagnolo (IT)
One Health approach in Waste Management

16:30 - 17:00 Coffee break + Poster discussion

TUESDAY OCTOBER 10
AFTERNOON

SESSION G5 / PINETA HALL / 15:00-16:30
WORKSHOP: FAST FASHION VS CIRCULAR ECONOMY

Chair / *Presidente:* Andreas Bartl (AT)

On the one hand the EU has put focus on textiles waste. As such the waste framework directive has been amended (e. g. defining textiles as municipal waste, separate collection by 2025) and the EU textile strategy has been announced as well in 2022. As a result, textile recycling processes must be established and measures taken to reduce the amount of textile waste. Among other things, durability, reparability or reuse of textiles must be fostered by EU member states. On the other hand, the fast-fashion business model has become more and more established in recent years. Fashion collections are brought to market at ever shorter intervals, with the quality and price of the items becoming lower and lower. An increase is now the "super-fast fashion", where a single company in the online trade puts several thousand new clothing items at dumping prices on the market daily. This fuels the sales and profits of the companies. At the same time, this business model causes enormous environmental impacts and is only possible disregarding social standards.
This workshop will explore the question of how to reconcile these two controversial developments. Which measures could be suitable to move the apparel industry towards more sustainability? What role can EPR play? Can this problem be solved by means of technology or are ethical approaches necessary?

Introductory lectures:

A. Bartl (AT)
General introduction to the topic

W. Ipsmiller (AT)
From fast fashion to super-fast fashion

A. Bartl, W. Ipsmiller (AT)
Fast fashion versus circular economy: an exciting match?

16:30 - 17:00 Coffee break + Poster discussion

ACTIVE LAB 05 / FOYER CONGRESS CENTRE / 15:00-16:30

WRITING AND PUBLISHING A SCIENTIFIC PAPER

Organised by / *Organizzato da:*
Alexandre Cabral, University of Sherbrooke (CA)

Writing is an art. To communicate effectively, you need to write well. The publication of scientific articles is a cornerstone of a research career. The main objective of this lab is to present to the attendees the main topics of the writing and publishing process. The formula adopted is unique and has helped PhD students, postdocs fellows and young professors from several countries in developing a simple and effective writing method to structure their thinking, communicate research results, organize discussions with co-authors (including their supervisors), and instruct future students. The actual course follows several formats, from semester-long to intensive two-week long. Over the course of the workshops, attendees learn how to deal with writer's block, how to write the main sections of an article and the letter to the editor, how to improve your English writing skills, and more. They also learn more about the peer review process. Together, these skills help them to write better scientific papers and increase the chances of having their papers published.
The aim of this active lab is to present the main topics of the course, the idea behind the teaching methodology and the various formats this course can follow.

Topics

- Understanding the importance of writing and publishing quality articles
- Developing a publishing strategy
- Clearly explaining the originality of your work
- Structuring your thinking and explain in clear writing the key messages
- Adopting a scientific style
- Understanding the particularities of the English language
- Developing the ability to recognize shifts in register
- Developing the ability to distinguish between function words and content words
- Preparing and writing the main sections of an article and the letter to the editor
- Providing appropriate figures and graphs
- Respecting ethical guidelines
- Understanding the submission and publication process

Complementary Objectives

- Structure the relationship between student and supervisor
- Improve the quality of meetings with supervisor

16:30 - 17:00 Coffee break + Poster discussion

TUESDAY OCTOBER 10
AFTERNOON

FOCUS SESSION I

CENTRAL HALL / 17:00-18:30

DEFINITION OF WASTE AND PRODUCTS. HOW FAR ARE WE WITH THE END OF WASTE PROCEDURE?

Moderator:
Rainer Stegmann - Hamburg University of Technology (DE)

Panelists:
Maria Pettersson - Luleå University of Technology (SE)
Pierre Hennebert - Former INERIS (FR)
Maria Cristina Lavagnolo - University of Padova (IT)
Alejandro Navazas - EuRIC-European Recycling Industries' Confederation (BE)

The great challenges of today are reducing/avoiding the emissions of climate gases and pollutants in the gaseous, liquid and solid form, saving natural and transformed resources, restoring biodiversity and remediation of contaminated sites. All these aspects are related to waste in its wider sense and have to be considered in the waste management area; they shall be implemented in accordance with the planetary boundary concept.
Using the today practised procedures of Circular Economy (CE) how far away are we from an end of waste society? What are the realistic potentials and limits to reach - or better - approach this goal? How realistic our recycling statistics or is there also green washing. Do we need new technologies, new regulations, more money, more efficient administration and citizen inclusion, More private or public WM companies, a broader education? How can we achieve more waste avoidance?
In how far do we have to include waste avoidance rates, produced emissions and energy consumption to evaluate CE procedures? Under which conditions is thermal treatment with energy recovery e.g., for paper, textiles and plastic an alternative to material recycling?
Products usually become waste if one wants to get rid of it; no matter in which condition the product is. What about bringing used products which are still in an acceptable condition back to the producer for refurbishing or recycling. In this way used products do not become waste in the first place, it is a kind of leasing concept with no financial revenues for the user. But there is an end of life of these refurbished/recycled products and they become waste for disposal. Is such a procedure realistic e.g., for washing machines, computer, etc.? What are potential hurdles? Can such a procedure be mandatory under the producer responsibility act?
These and may be other aspects of waste reduction and material saving are the themes for the discussion in this Focus Session.

TUESDAY OCTOBER 10
SOCIAL EVENT

GO-KART RACE: 2ND RALLY SARDINIA SYMPOSIUM
Leisureland Area, Forte Village, h. 21:30

The activity will take place on a 500 m professional circuit!
The race consists of a qualifying session, a semi-final and a final session.
The sessions will be scheduled based on the total number of participants and the number of teams identified.

Seats are limited! Book your place no later than Monday evening.
The cost for participating in the tournament is € 50 + VAT 22%.
Both delegates and accompanying persons can take part in the race.

The lap time will be calculated automatically by the telemetry system.
All participants and the public will be able to see in real time the progress of the race on a led monitor located just in front of the stands on the finish line.
At the end of each session, the winners will pass the round to the semifinal session and then, following a further selection, the session winners will pass the round to compete in the final session.
Before the start of the race, a technical briefing will be carried out by the technical staff of the track.
All drivers must wear a helmet (provided free of charge by the track staff), shoes and comfortable clothing.
During the race, they must comply with the flags and the race regulations as well as the safety rules and signals indicated by the technical staff positioned along the entire track.
At the end of the race, there will be a podium where the winner will be announced and a prize ceremony with national anthem and prosecco!
Book your seats now at the registration desk!

DAY 3 / WEDNESDAY OCTOBER 11

WEDNESDAY OCTOBER 11
MORNING

SESSION A6 / CENTRAL HALL / 9:00-10:30
C&D WASTE: QUALITY & CLASSIFICATION

Chair / *Presidente:*

L. Yuan, W. Lu, J. Chen (HK)
Automatic estimation of recyclable construction waste compositions: A combinatorial computer vision-big data approach

X. Gao (CN)
Construction and demolition waste classification based on convolutional neural networks combined with knowledge transfer approach

K. Nakamura, A. Matsuno, T. L. Nguyen, V. T. Nguyen, H. G. Nguyen, H. Sakanakura, Y. Isobe, K. Kawamoto (JP)
Evaluation of environmental safety for recycled roadbed materials - Leaching characteristics of heavy metals

M. Castro-Diaz, M. Osmani, S. Cavalaro, P. Needham, S. Newport, M. Sands, B. Parker (UK)
Assessment of plasterboards containing chemically purified gypsum waste

10:30 - 11:00 Coffee break

SESSION A7 / CENTRAL HALL / 11:00-12:30
C&D WASTE: POLICIES & STRATEGIES

Chair / *Presidente:* Cristina Trois (ZA)

E. Bietlot, C. Collart (BE)
End of waste of recycled aggregates in Wallonia: how to promote circular economy in the construction sector

J. zum Brock , M. Doostdar, A. Morales Rapallo, K. Kuchta (DE)
Advancements in pre-demolition audit processes

W. Lee, W. Lu (HK)
Public policies on illegal construction waste disposal in Hong Kong: evaluation and enhancement

F. Karaca, A. Tlueken (KZ)
Reforming construction waste management in Kazakhstan: a cost-benefit analysis of circular economy strategies for upgrading C&DW recycling centres in urban areas

SESSION B6 / CENTRAL HALL 2 / 9:00-10:30

RECOVERY OF MATERIAL FROM PLASTIC WASTE

Chair / *Presidente:* Alejandro Navazas (BE)

D. Konkina, H. Flachberger, H. Schwarz (AT)
Development of recycling production line for PVC from cable scrap

M. Peer, B. Berninger, T. Fehn, A. Hofmann (DE)
Chemical recycling of PVC-containing plastic waste for recycling of critical metals

J. Geier, C. Barretta, M. Bredács, G. Oreski (AT)
Polypropylene recycling – How to improve the quality of PP recyclates

C. Barretta, G. Koinig, M. Bredács, J. Geier, E. Grath, L. Meinhart, E. Helfer, G. Oreski (AT)
Sorting of plastic packaging films, removal of multilayers and effects on properties of recyclates

F. De Bruijn, F.J. Cañavate, M. Fajardo, X. Colom (ES)
Viability of Mechanochemical devulcanization process of EPDM elastomeric waste

10:30 - 11:00 Coffee break

SESSION B7 / CENTRAL HALL 2 / 11:00-12:30

DECISION TOOLS IN WASTE MANAGEMENT

Chair / *Presidente:* Anders Damgaard (DK)

B. Rutrecht, S. Rosskogler, T. Nigl, R. Pomberger (AT)
Zero Waste - Chances and risks of (not) applying zero waste strategies and the importance of measuring sustainability in the recycling sector

T. Hagedorn, A. do Carmo Precci Lopes, L. Schebek, M. Vogelgesang, W. Benner, C. Li, C. Plociennik, Hossein, S. Knetch, B. Kellerer (DE)
The practical use of a digital product passport - Development of an application-friendly tool for e-waste decision support

A.M. Domingues, R.G. Souza, S.D. Mancini, F.C.S. M. Padoan, J.R.A. da Silva (BR)
Life Cycle Assessment of scenarios for end-of-life management of lithium-ion batteries from smartphones and laptops

Y.G. Abera, C. Trois (ZA)
The Wrose model's methodological aspects and its four levels of sustainability indicators

Y. Tan, Z. Wen (CN)
Historical evolution analysis of China embodied plastics footprint from 2002 to 2017

WEDNESDAY OCTOBER 11
MORNING

SESSION C6 / PANORAMA HALL / 9:00-10:30
FOOD WASTE GENERATION & MANAGEMENT

Chair / *Presidente:* Erwin Binner (AT)

L. Preite, G.P.C. Tancredi, A. Paini, G. Vignali (IT)
Development of a simulation model to carry out technical-economical analysis of a food waste valorisation process

T. Okayama, K. Watanabe, H. Yamakawa (JP)
Which food parts are considered edible and should be included in food waste reduction targets

G. Obersteiner, S. Luck, R. Ottner, E. Schmied (AT)
Food waste generation in school catering

G. Obersteiner, S. Luck, L. Ortega Menjivar, E. Schmied (AT)
Representative study on food waste generation in Austrian households

K. Watanabe, T. Okayama, H. Yamakawa, M. Nonomura, Y. Seta (JP)
Development and investigation on an effective intervention method with a 'nudge' factor for reducing avoidable food waste from households

10:30 - 11:00 Coffee break

SESSION C7 / PANORAMA HALL / 11:00-12:30
FOOD WASTE MINIMIZATION

Chair / *Presidente:* Peter Shaw (UK)

N. Sundin, C. Malefors, L. Bartek, M. Eriksson (SE)
Reducing food waste in Swedish school catering: testing the effectiveness of nudging

Y. Seta, H. Yamakawa, T. Okayama, K. Watanabe, M. Nonomura (JP)
Interventions to prevent household food waste with supporting tools: Effects on awareness and food waste reduction

N. Sundin, L. Bartek, C. Malefors, M. Eriksson (SE)
Unveiling the key success factors for effective surplus food donation – A case study from Sweden

M. Eriksson, L. Bartek, N. Sundin, C. Malefors (SE)
Reducing waste of eggs in supermarkets - Evaluating the impact of a policy change

M. Nonomura, H. Yamakawa, T. Okayama, K. Watanabe, Y. Seta (JP)
Promotion of "Use-Up Day" by local governments in Japan: influence of waste reduction campaigns on household food waste behavior

SESSION D6 / EX CHIESA HALL / 9:00-10:30

EDUCATION & COMMUNICATION

Chair / *Presidente:* Jutta Gutberlet (CA)

G. De Feo (IT)
How an innovative environmental education program can help the waste management sector

J. Zeilinger, G. Ecker (AT)
Greening humanitarian aid: integrating solid waste management into WASH emergency response trainings - A case study of the Austrian Red Cross training plan

L. Lombardi (IT)
LIFE-C: promoting Life Cycle thinking in higher education

B. Hauge (DK)
Is it possible to transform citizens' reluctance towards reusing personalized objects?The case of discarded bed mattresses

V. Leppälä, S. Vanhamäki, K. Manskinen (FI)
Promoting the separate collection of biowaste through citizen engagement

10:30 - 11:00 Coffee break

SESSION D7 / EX CHIESA HALL / 11:00-12:30

THERMAL RECYCLING OF PLASTIC WASTE

Chair / *Presidente:* Umberto Arena (IT)

U. Arena, F. Parrillo, C. Boccia, F. Ardolino (IT)
Advanced recycling technologies for mixed plastics waste. A review

A. Veksha, Y. Wang, G. Lisak (SG)
Hydrogen from plastic waste: effects of feedstock composition on product characteristics

H.J. Kim, J.W. Kim, J.S. Kim (KR)
Steam gasification of waste plastic using a two-stage gasifier for producing clean hydrogen-rich syngas with active carbon

B.B. Perez-Martinez, A. Lopez-Urionabarrenechea, E. Acha, B.M. Caballero, A. Serras-Malillos, J. de la Torre-Bilbao (ES)
Thermochemical conversion of plastic-rich waste coming from sorting of municipal solid waste (MSW) into oils of interest for the petrochemical industry

S. Lotfi, M. Beaulne, J.-C. Morais, W. Ma, K. Austin, J. Butler (CA)
Hydrothermal gasification of plastic: exploratory study for the conversion of waste to hydrogen as a zero-carbon fuel

WEDNESDAY OCTOBER 11
MORNING

SESSION E6 / BIANCA HALL FOYER / 9:00-10:30
ASSESSMENT AND PREDICTION OF LANDFILL GAS

Chair / *Presidente:* Peter Kjeldsen (DK)

E. Allegrini, M. Lozano, P. Kumar, A. Shah, O. Laurent, G. Broquet, P. Ciais, M. Kerkar, G. Mauguen, M. Nibart, V. David, D. Buty, O. Oberti (FR)
Assessing biogas emissions from 5 landfills: measurements and predictive gas models comparison and lessons learned

S. Setu, I.M. Rafizul, S. Berner, M. Alamgir, E. Kraft (BD)
Analysis of methane gas emission by LandGEM model from open dump landfill in Khulna of Bangladesh

K. Kissas, A. Ibrom, P. Kjeldsen, C. Scheutz (DK)
Changes in the methane oxidation efficiency of a passive biocover system due to barometric pressure

S. Herzet, C. Collart, E. Bietlot (BE)
Biogas monitoring at the end of aftercare phase on a landfill site in Wallonia

10:30 - 11:00 Coffee break

SESSION E7 / BIANCA HALL FOYER / 11:00-12:30
AERIAL BASED LANDFILL MONITORING

Chair / *Presidente:* Hideki Yoshida (JP)

C. Scheutz, N.T. Vechi, J. Knudsen (DK)
Validation and application of a drone-based method for fugitive emissions quantification

N. Proietti, T. Thorbjornsson (IS)
UAV-based whole-site methane emissions quantification at Reykjavik landfill site

D. Risk, E. Bourlon, R. Martino, J. Stuart, D. Ghasemi, A. Khaleghi, C. Fougère, L. Coyle, A. Kennedy, M. Boyd, G. Perrine, M. Lavoie, J. Vogt, S. Kennedy, E. Copp, M. Hammer, C. Hall, L. Gillespie, F. Vogel, S. Ars, S. Fraser, E. Gilbertson (CA)
Large-scale Canadian landfill methane quantification survey

V. Baiocchi, A. Bosman, F. Cianfanelli, V. Marzaioli, Q. Napoleoni (IT)
UAV settlement monitoring on a sanitary landfill

SESSION F6 / NATURISTA HALL / 9:00-10:30

WORKSHOP: ADVANCED ISSUES IN WASTE GASIFICATION

Chair / *Presidente:* Massimiliano Materazzi (UK)

Introductory lectures:

F. Parrillo, C. Boccia, G. Ruoppolo, V. Arconati, F. Ardolino, U. Arena (IT)
Steam reforming of tars in hot syngas cleaning: Removal efficiency of different waste-derived catalysts

X. Fu, W.P. Chan, Y.Z. Boon, V.M.P. Chin, Y. Zhao, A. Veksha, L.Y. Ge, Y. Zhou, S.A Snyder, G. Lisak (SG)
Waste reduction and NEWSand generation by co-gasification of sludge and municipal solid waste in Singapore

10:30 - 11:00 Coffee break

SESSION F7 / NATURISTA HALL / 11:00-12:30

WORKSHOP: RECENT DEVELOPMENT IN LANDFILL AERATION

Chair / *Presidente:* Marco Ritzkowski (DE)

The aim of the workshop is to recap the development (and adaptations made during the past two decades) of the in situ aeration technology and its application. Nowadays, landfill aeration is often recognized as a methodology for the controlled avoidance of GHG emissions from landfills. However, initially the approach was to enhance the environmental behavior of landfills, both by the reduction of LFG and leachate emissions (during and particularly after the aeration process).
We will discuss latest findings of ongoing and completed projects and identify the potentials and limitations of this methodology.

Introductory lectures:

M. Ritzkowski (DE)
Introduction into the development of the in situ aeration technology and its application

R. Stegmann (DE)
Examples of aeration projects in Germany

WEDNESDAY OCTOBER 11
MORNING

SESSION G6 / PINETA HALL / 9:00-10:30

WORKSHOP: RETHINKING CIRCULAR ECONOMY IN VIEW OF BIODIVERSITY REGENERATION

Chair / *Presidente:* Maria Cristina Lavagnolo, Giovanni Felici (IT)

Organised by: NBFC (National Biodiversity Future Center), University of Padova* / Sant'Anna School of Advanced Studies** Received funding from Next-GenerationEU (Italian PNRR 3 M4 C2, Invest 1.4 3 D.D. 1034 del 17/06/2022, CN00000033)

The loss of biodiversity is one of the most dramatic consequences of climate change and human impact. For several years, the importance of biodiversity for our planet has been underestimated, especially for its economic relevance on our extractive economies. Biodiversity provides several ecosystem services essential for human life such as food, materials, clean water, climate regulation, and many others.... *Full appetizer on the website*

Introductory lectures:

M.C Lavagnolo, V.Cucino**, A. Piccaluga** (IT)* / Introduction to biodiversity and circular economy: the NBFC project

*D. Tosi**, S. Tessitore**, F. Testa** (IT)* / The systemic approach to explore the relationship between business and biodiversity: the role of regenerative business models

*N. Braico**, L. Cinquini** (IT)* / Measuring companies9 impacts on and dependencies from biodiversity

G. Felici, A. Lanzavecchia* (IT)* / Economic valuation of ecosystem services: an example applied to the solid waste management system

10:30 - 11:00 Coffee break

SESSION G7 / PINETA HALL / 11:00-12:30

WORKSHOP: FUTURE FOR PUBLIC COMMUNICATION ABOUT WASTE

Chair / *Presidente:* Ian Williams, Peter Shaw (UK)

Traditional methods of public communication about waste tend to have limited, mainly short-term impacts. To communicate waste-related information in a way that is more accessible to the public, and actually leads to desired behaviour change, new methods must be explored. Citizen support is essential for implementation of ambitious waste-related policies/strategies/action plans. This workshop will address the question "What is the future for public communications about waste?" An initial overview presentation will set the context for the workshop; this will outline typical methods currently used to communicate/consult with the public, with illustrative examples. As an introductory exercise, participants will be asked to provide their views on the topic, and the other questions it generates.

ACTIVE LAB 06+07 / FOYER CONGRESS CENTRE / 9:00-12:30

MONITORING TECHNIQUES OF ODOURS IN WASTE MANAGEMENT

Organised by / *Organised by:*

Tiziano Bonato, SESA S.p.A, Analysis laboratory - Este, Padova (IT)
Nicolò Quagliato, SESA S.p.A, Analysis laboratory - Este, Padova (IT)
Alberto Pivato, University of Padova (IT)

Waste management has always been closely linked to the odours issue. Recent attention to this issue has led regulators and standardization bodies to introduce specific regulations and special standards for confinement and monitoring. The contents of the most recent European and International standards will be described during the Active Lab.
Among them, instructions to determine odour in ambient air using field inspection according to EN 16841 and to determine odour concentration in dynamic olfactometry according to EN 13725 will be discussed in depth. In addition, the performance of the odour monitoring through instrumental monitoring systems will be demonstrated and tested in practice, such as electronic nose and active and passive samplers for the detection of tracer compounds.
The active lab will last four hours including theory and practical exercitation with instruments.

- European and international standards on the issue of odor measuring and monitoring: an overview
- Electronic nose: operating principles and practical testing
- Odor monitoring via “tracer” compunds determination: passive and active sampling, chemical analysis

10:30 - 11:00 Coffee break

WEDNESDAY OCTOBER 11
AFTERNOON

SESSION A8 / CENTRAL HALL / 15:00-16:30
C&D WASTE: VALORIZATION
Chair / *Presidente:* Ferhat Karaca (KZ)

J. Lederer, D. Blasenbauer (AT)
The role of demolition waste reduction and recycling to reduce energy demand, greenhouse gas emissions and resource consumption: a case study from Vienna

A. Morales Rapallo, J. zum Brock, M. Doostdar, K. Kuchta (DE)
Utilization of recycled aggregates in concrete case study

C. Trois, C. Loggia (ZA)
The potential of valorisation of construction & demolition waste. Towards circular practices in the built environment in Durban

J. Fernandes, P. Ferrão (PT)
Improving building refurbishment strategies to promote Circular Economy

16:30 - 17:00 Coffee break + Poster discussion

SESSION B8 / CENTRAL HALL 2 / 15:00-16:30
PFAS IN LANDFILLS ENVIRONMENT
Chair / *Presidente:* Jurate Kumpiene (SE)

M. Johansson, M. Pettersson (SE)
Environmental law issues regarding PFAS pollution in waters around landfills in Sweden

A. Varma A., G.K. Varghese (IN)
PFAS (per-and poly-fluoroalkyl substances) detected for the first time in the landfill leachate of Kerala

A. Salih (AU)
Case study: containment of PFAS contaminated soil at a landfill site

M. Saleem, M. Pasquale, G. Tomei, K. Ulucan-Altuntas, M. Roverso, S. Bogialli , E. Marotta, M.C. Lavagnolo (IT)
Performance evaluation of three atmospheric plasma reactors for the treatment of aged/stabilized landfill leachate containing PFAS

K. Ulucan-Altuntas, E. Filippetto, M. Saleem, G. Tomei, E. Marotta, C. Paradisi (IT)
Treatment performance of atmospheric cold plasma enhanced by boron-doped reduced graphene oxide for degradation of perfluorooctanoic acid (PFOA)

16:30 - 17:00 Coffee break + Poster discussion

SESSION C8 / PANORAMA HALL / 15:00-16:30

WASTE IN AGRICULTURE

Chair / *Presidente:* Giovanna Cappai (IT)

O.A. Lavrichshev, V.E. Messerle, A.L. Mosse, G. Paskalov, M.N. Orynbasar, A.B. Ustimenko (KZ)
Plasma-chemical processing of agricultural waste: numerical analysis and experiment

H.N. Abu Tayeh, Y. Gerchman, J. Asscher, J. Venus, R. Schneider, H. Azaizeh (IL)
Olive mill solid waste for added value applications

S. Ochiai, K. Ishii, G. Ham, T. Furuichi (JP)
Evaluation of the impact of biogas plant introduction on material cycle in dairy farming area in Japan

T. Hoang, O. Larsen, J. Kurz, V.R. Rotter, L. Fechter (DE)
Fertilization potential of recovered sulfur from biogas purification

M. Faraldi, R. Prugger, F. Monzò Sánchez, S. Martinez Lopez (IT)
The hidden value of agri-food residues, revealed and boosted through a circular approach: Agro2Circular

M. Miccio, B. Tauleigne, M. Fraganza, P. Brachi, D. Albanese (IT)
Engineered recovery of bioactive substances from the residues of hazelnut agro-industrial processing

16:30 - 17:00 Coffee break + Poster discussion

SESSION D8 / EX CHIESA HALL / 15:00-16:30

FLY ASH: CHARACTERIZATION & TREATMENT

Chair / *Presidente:* Ole Hjelmar (DK)

M. Šyc, E. Korotenko, J. Jadrný, T. Baloch, P. Mašín (CZ)
Material recovery in waste-to-energy fly ash treatment

J.M.C. Tan, A. Saffarzadeh, T. Shimaoka (JP)
Behavior of landfilled stabilized fly ash treated by different treatment methods for the past 27 years

E. Korotenko, M. Syc, J. Jadrny, T. Baloch, P. Masin, L. Gric (CZ)
Possibilities of fly ash/APCr treatment in waste-to-energy plant: the environmental perspective

Y. Zhang, D.C.W. Tsang (HK)
Tailoring low-carbon cementitious materials with high GGBS incorporation for stabilization/solidification of MSWI fly ash

A. R. Jahangiri, S. Sala, B. Ebin, C. Nilsson, K. Karlfeldt Fedje, J. Rissler (SE)
Single particle fly ash analysis for improved elemental correlation outcomes in synchrotron-based NanoXRF

W. Qi, J. Liu (JP)
Safe reutilization of MSWI fly ash from grate furnace and fluidized bed incinerator via a co-reduction process

16:30 - 17:00 Coffee break + Poster discussion

WEDNESDAY OCTOBER 11
AFTERNOON

SESSION E8 / BIANCA HALL FOYER / 15:00-16:30
LEACHATE RECIRCULATION

Chair / *Presidente:* Keith Knox (UK)

A. Stringfellow, R. Beaven, T. Rees-White, J. Smethurst, W. Powrie, T. Kanen (UK)
Installation of a vadose zone monitoring system for tracer testing in a municipal solid waste landfill subject to leachate recirculation

N. Quist, F. van Raffe, T.C. Rees-White, R.N.J. Comans (NL)
Vertical heterogeneity of organic matter in the pore water of a municipal solid waste landfill subject to leachate recirculation

F. van Raffe, N. Quist, T.C. Rees-White, R.N.J. Comans (NL)
Vertical heterogeneity of contaminants in the pore water of a municipal solid waste landfill subject to leachate recirculation

T. Rees-White, M. Feenstra, T. Kanen, R. Beaven, J. Gebert (UK)
Borehole dilution tests to measure leachate flow at a recirculation landfill

16:30 - 17:00 Coffee break + Poster discussion

SESSION F8 / NATURISTA HALL / 15:00-16:30

WORKSHOP: ECOTOXICOLOGY FOR WASTE MANAGEMENT

Chair / *Presidente:* Roberta Pedrazzani (IT)

The potential of ecotoxicology in assessing the compatibility of waste for reuse or disposal is now acknowledged. The literature describes use on many matrices, including sewage sludge, compost, marine sediments, and inorganic waste. On the one hand, the application of such assays is already found in end-of-waste procedures. On the other hand, the knowledge gap is very wide, as there is opportunity for improvement with regard to, for example: certain waste types; recovery areas; biological assays to be used (specific endpoints; modes of action; protocol implementation; uncertainty assessment; interpretation and standardization of results; etc.). The workshop aims to assess the current state of the art.

Introductory lectures:

R. Pedrazzani - University of Brescia (IT)
Conventional, standardized and innovative ecotoxicity tools

A. Pivato, G. Beggio - University of Padua (IT)
End-of-waste and waste classification: the role of ecotoxicology

C. Alias - University of Brescia (IT)
Bioassays as a support for end-of-waste definition: case studies

L. Gomez, E. Porcel Rodriguez, I. Sanseverino, D. Marinov, R. Carafa, P. Sciuto, M. Carere, D. ten Hulscher, T. Lettieri - European Commission, DG Joint Research Centre (EU)
Effect-based methods and their implementation in the monitoring program: From Science to Policies

G. Bertanza, M. Menghini - University of Brescia (IT)
Integrated data processing of ecotoxicological analyses

16:30 - 17:00 Coffee break + Poster discussion

WEDNESDAY OCTOBER 11
AFTERNOON

SESSION G8 / PINETA HALL / 15:00-16:30
WORKSHOP: ELASTANE, THE PEST IN TEXTILE RECYCLING

Chair / *Presidente:* Andreas Bartl (AT)

Elastane (EL), is a highly flexible synthetic fiber also known as Spandex or Lycra. Even though the EL production volume only accounts for about 1% of the total fiber market the fiber is, in low concentrations, contained in a large portion of garment. Even if the share of EL is sometimes only in the low single-digit percentage range, recycling of such textiles is made considerably more difficult or even impossible. So far, it is not even known exactly how high the proportion of apparel containing elastane is. Furthermore, a rapid and reliable determination of the EL content in textiles (apart from a cumbersome ISO method) has only recently been presented and finally the separation of EL from garments is still in its infancy. The aim of the workshop is to bring together experts and discuss possible solutions. The state of the art will be presented and potential methods that could be implemented as a pre-stage to a recycling process will be evaluated. Ultimately, the apparel industry must move towards a circular economy in accordance with EU requirements.

Introductory lectures:

A. Bartl (AT)
General introduction to the topic

P. Kählig (AT)
Determination of the proportion of garments containing elastane in Viennese textile waste

E. Boschmeier, V.-M. Archodoulaki, A. Schwaighofer, B. Lendl, A. Bartl (AT)
A tool for quantification of elastane in textile waste to avoid recycling problems

H. Stipanovic (AT)
Elastane, big problem in small amounts for NIR spectroscopy?

16:30 - 17:00 Coffee break + Poster discussion

ACTIVE LAB 08 / FOYER CONGRESS CENTRE / 15:00-16:30

WRITING AND PUBLISHING A SCIENTIFIC PAPER

Organised by / *Organised by:*

Alexandre Cabral, University of Sherbrooke (CA)

Writing is an art. To communicate effectively, you need to write well. The publication of scientific articles is a cornerstone of a research career. The main objective of this lab is to present to the attendees the main topics of the writing and publishing process. The formula adopted is unique and has helped PhD students, postdocs fellows and young professors from several countries in developing a simple and effective writing method to structure their thinking, communicate research results, organize discussions with co-authors (including their supervisors), and instruct future students. The actual course follows several formats, from semester-long to intensive two-week long. Over the course of the workshops, attendees learn how to deal with writer's block, how to write the main sections of an article and the letter to the editor, how to improve your English writing skills, and more. They also learn more about the peer review process. Together, these skills help them to write better scientific papers and increase the chances of having their papers published. The aim of this active lab is to present the main topics of the course, the idea behind the teaching methodology and the various formats this course can follow.

Topics

- Understanding the importance of writing and publishing quality articles
- Developing a publishing strategy
- Clearly explaining the originality of your work
- Structuring your thinking and explain in clear writing the key messages
- Adopting a scientific style
- Understanding the particularities of the English language
- Developing the ability to recognize shifts in register
- Developing the ability to distinguish between function words and content words
- Preparing and writing the main sections of an article and the letter to the editor
- Providing appropriate figures and graphs
- Respecting ethical guidelines
- Understanding the submission and publication process

Complementary Objectives

- Structure the relationship between student and supervisor
- Improve the quality of meetings with supervisor

16:30 - 17:00 Coffee break + Poster discussion

WEDNESDAY OCTOBER 11
AFTERNOON

FOCUS SESSION II

CENTRAL HALL / 17:00-18:30

DO WE NEED NEW DEFINITION AND REGULATIONS FOR LAND-FILLING IN CIRCULAR ECONOMY?

Moderator:

Raffaello Cossu - University of Padua (IT)

Panelists:

Kerstin Kuchta - Hamburg University of Technology (DE)

Robert Gregory - Gregory Environmental Consulting Ltd (UK)

Representation of Circular Economy as a perfect cycle is not realistic. For many reasons:

- not all materials are recyclable, and those that are cannot be recycled ad infinitum;
- hazardous and persistent chemical substances present in the products forwarded to recycling tend to accumulate in the recycled materials and residues;
- the material cycle in Circular Economy should necessarily be closed in line with the principle of Back to Earth to control the global diffusion of contaminants; accordingly, if what is taken from the land is not returned to the land in an uncontaminated form, it will linger perilously in the environment (Grossule, 2020);
- in closing the material loop, the strategically important role as a sink played by landfill should be not taken into account.

Landfilling in order to act as a sink should undergo a profound revision either in terminology (to make clearly the difference between traditional landfills where contaminants are present in a mobile form and sustainable landfill where waste is pretreated in order to stabilize/immobilize contaminants) either in the regulation.
The Focus Session will discuss if a landfill is necessary for closing the material loops in Circular Economy and conversely if alternative sink could substitute it.

WEDNESDAY OCTOBER 11
SOCIAL EVENTS

ACTIVITIES FOR PHYSICAL AND MENTAL WELL-BEING
Time and details available in the congress hall

Following the enthusiastic participation of all delegates during the previous edition of Sardinia Symposium in 2021, we are happy to organise again a set of activities for physical and mental well-being to be held during the symposium week from sunrise to midnight, involving all of you, not only as participants but also as trainers!
Do you practise Yoga, Pilates, Padel, Tai Chi, Tango, Capoeira, Salsa, Functional Training, Running session on the beach, Nordic Walking or other traditional disciplines of your country? Would you like to teach what you know to friends and colleagues in a relaxing and nice atmosphere?
This is your chance to lead a class for one night in the wonderful setting of the Forte Village!
We would love to hear your proposals and have fun together!
Contact us at the registration desk.

Confirmed activities so far:

- Pilates class by Alexandre Cabral, University of Sherbroke (CA)
- Functional Training by Carlo Cossu, University of Pretoria (ZA)
- Padel class by Mattia Trapani, 16bit (IT)
- Football match by Valentina Grossule, University of Padova (IT)

Please book your place!
Sign your name in the lists available in the main congress hall.

DAY 4 / THURSDAY
OCTOBER 12

THURSDAY OCTOBER 12
MORNING

SESSION A9 / CENTRAL HALL / 9:00-10:30
RECYCLING OF WEEE

Chair / *Presidente:* Stefan Salhofer (AT)

C. Zafiu, H. Steiner, A. Jandric, H. Böni, S. Salhofer (AT)
Definition, classification and mapping of pervasive electronic products

A. Otsuki (SE)
Non-destructive characterization of milled printed circuit board particles for their recycling purpose

E. Schmied, M. Pamperl, G. Obersteiner (AT)
Analysis of the collection rate of refrigerators and freezers in Austria

S. Gulshan, H. Shafaghat, H. Yang, W. Yang, P. Evangelopoulos (SE)
Performance evaluation of ex-situ catalytic pyrolysis of WEEE fraction

G. Dodbiba (JP)
Recovery of valuable materials from spent LED light bulbs for recycling: an integrated environmental and economic assessment for identifying the best treatment option

C. Tzala, E. Kastanaki, C. He, A. Giannis (GR)
Design of a photovoltaic waste recycling system in Greece

D. Fontana, F. Forte, C. Marcoaldi, O. Masetti, V. Piergrossi, M. Pietrantonio, S. Pucciarmati, M. Tammaro (IT)
Materials recovery from end-of-life electrochemical storage systems: preliminary results from the IEMAP project

10:30 - 11:00 Coffee break

SESSION A10 / CENTRAL HALL / 11:00-12:30
PACKAGING WASTE: CHARACTERIZATION

Chair / *Presidente:* Mentore Vaccari (IT)

H. Stipanovic, P. Arth, G. Koinig, A. Tischberger-Aldrian (AT)
Classification of plastic waste packaging multilayer films using handheld near-infrared (NIR) spectrometer

L. Gritsch, G. Breslmayer, R. Rainer, J. Lederer (AT)
Analysis of non-beverage hollow plastic packaging from MSW regarding product residues and packaging characteristics

N. Kuhn, G. Koinig, A. Tischberger-Aldrian (AT)
Comprehensive characterisation of lightweight packaging waste to improve recycling

J. Guo, A. Alassali, K. Kuchta (DE)
Influence from printing ink binder resin on the quality of Low-Density-Polyethylene (LDPE) recycling under extrusion process

M. Faraldi, S.J. Benitez-Benitez, S. García, F. Leipold, A. Gómez-Mompeán, C. Sirvent, P. Süss, H. Brundiek, R.M. Martínez-Espinosa, E. de Vries, F. Monzò (IT)
Upcycling of polyethylene terephthalate (PET) wastes to generate biodegradable bioplastics for food and drink packaging

SESSION B9 / CENTRALL HALL 2 / 9:00-10:30

MICROPLASTICS IN SURFACE WATERS

Chair / *Presidente:* Valentina Grossule (IT)

G. Walburn, I. D. Williams (UK)
Macro-, meso- and micro-plastics around an iconic chalk river: distribution, abundance, types and potential sources

S. Lenz, R. Ottner, G. Obersteiner (AT)
Evaluation of different sampling methods for microplastic monitoring in rivers

R. Ottner, S. Lenz, G. Obersteiner (AT)
Comparison of different methods for river sample microplastic analysis

M.C. Lavagnolo, M. Modesti, V. Poli (IT)
PLA degradation in fresh water according to EN ISO 14851

T. Gutsa, T. Mani, C. Trois (ZA)
Using floating GPS drifters to understand the pathways and fate of macroplastic debris In South Africas Umgeni river estuary

V. Poli, M.C. Lavagnolo, L. Litti (IT)
Sampling of microplastics in the Atlantic Ocean

10:30 - 11:00 Coffee break

SESSION B10 / CENTRALL HALL 2 / 11:00-12:30

MICROPLASTICS IN COMPOSTING & ANAEROBIC DIGESTION

Chair / *Presidente:* Almut Reichel (DK)

C, Zafiu, B. Vay, E. Binner, M. Huber-Humer (AT)
Digestates and composts: Macro- and microplastics in biological waste treatment facilities

S. Dilraj, E. Johnson, T.S. Anantha Singh, G.K. Varghese, C. Zafiu (IN)
Heavy metal accumulation on microplastics in compost - The role of biofilm

T. Hu, F. Lü, Z. Yang, H. Zhang, P. He (CN)
Source tracking microplastics in household biogenic waste digestate

M. Falzarano, A. Polettini, R. Pomi, A. Rossi, T. Zonfa, M.P. Bracciale, F. Sarasini,

J. Tirillò, G. De Gioannis, A. Muntoni (IT)
Compostable single-use items as a source of micro-bioplastics in digestate

THURSDAY OCTOBER 12
MORNING

SESSION C9 / PANORAMA HALL / 9:00-10:30
ANAEROBIC DIGESTION: BIOHYDROGEN & OTHER ADVANCED ASPECTS

Chair / *Presidente:* Jonathan Wong (HK)

S.M. Ng, A. Kosheleva, M. Petersmann, I. Atamaniuk, K. Kuchta (DE)
Identification of stability indicators for in-situ biomethanation during dry batch fermentation of biowaste: literature review and statistical analysis

A. Dell'Orto, C. Trois (ZA)
Potential for bio-hydrogen production from organic waste in a large South African Metropolitan Municipality

A. Kosheleva, S.M. Ng, M. Petersmann, K. Kuchta (DE)
In-situ hydrogen biomethanation in dry discontinuous fermentation

D.D. Zhao, H.R. Yuan, Y. Chen, D.Z. Chen (CN)
A combinatorial optimization study of food waste anaerobic digestion pre- and post-treatments by using P-graph method

M. Falzarano, T. Kamperidis, G. Kanellos , G. Lyberatos, A. Polettini, R. Pomi, A. Rossi, A. Tremouli, T. Zonfa (IT)
Enhancing energy recovery from cheese whey through dark fermentation combined with different bio-electrochemical processes

M. Kumari, M.K. Chandel (IN)
Assessing the impact of sewage sludge from different wastewater treatment technologies on biomethane potential in anaerobic co-digestion assay

10:30 - 11:00 Coffee break

SESSION C10 / PANORAMA HALL / 11:00-12:30
GREENHOUSE GASES IN BIOWASTE MANAGEMENT

Chair / *Presidente:* Elisa Allegrini (FR)

J.W.C. Wong, M.K. Manu, D. Li (HK)
Circular economy of food waste digestate composting

S. Stegenta-Dabrowska, P. Telega, M. Dworniczak, E. Sygula, M. Bednik (PL)
Effective GHG mitigation from composting with the use of biochar from compost

G. Ham, N. Shinoda, K. Ishii, S. Ochiai (JP)
Recovery potential of Nitrogen and Phosphorus from biomass waste management system and their impact on GHG emission in Japan

B. Batinic, I. Berezni, B. Tot, T. Marinkovic, G. Vujic (RS)
Estimation of GHG emissions for different food waste categories from restaurants - Case study of Novi Sad (Serbia)

SESSION D9 / EX CHIESA HALL / 9:00-10:30

MSWI BOTTOM ASH: CHARACTERIZATION & RECOVERY OPPORTUNITIES

Chair / *Presidente:* Giulia Costa (IT)

J. Mühl, S. Hofer, D. Blasenbauer, F. Feher, J. Lederer (AT)
Treatment of MSWI bottom ash from grate incineration and fluidized bed combustion: a comparison

S. Hofer, J. Mühl, J. Lederer (AT)
Chemical analysis of the output-flows of an IBA processing plant in Austria – The fate of Pb and Cd

O. Hjelmar, J. Hyks, J. Kallesøe, S. Dyhr-Jensen (DK)
Utilisation of MSWI bottom ash in Denmark - A valuable contribution to the circular economy

H. Muñiz Sierra, M. Syc, F. Meneces Fuertes (CZ)
Optimization of a selective fragmentation process for the improvement of copper recovery in the incineration bottom ash fine fraction

M. van Praagh, J. Lundberg, J. Rissler, A. Rundegren, A. Larsson, S. Janhäll (SE)
Dust emissions and deposition during construction works with recycled MSWI-bottom ash

10:30 - 11:00 Coffee break

SESSION D10 / EX CHIESA HALL / 11:00-12:30

BOTTOM ASH IN CONCRETE PRODUCTION: PROCESS & ENVIRONMENTAL BEHAVIOR

Chair / *Presidente:* Giovanni Beggio (IT)

D. Laner, I. Vateva, M. Laabs, B. Middendorf (DE)
Processing routes for municipal waste incineration bottom ash as a substitute for aggregates and binders in concrete

F. Feher, J. Mühl, J. Hron, O. Zeman, J. Lederer (AT)
Properties of concretes containing fluidized bed combustion bottom ash as partial substitute for natural aggregate

J. Hyks, O. Hjelmar (DK)
Initial screening of leaching of per-and polyfluoroalkyl substances (PFAS) from Danish municipal solid waste incineration bottom ash used as secondary aggregate

L. Acampora, G. Costa, F. Lombardi, C. Mensi, I. Verginelli (IT)
Proposal of a tiered risk-based approach for evaluating the utilisation potential of mineral fractions from incineration bottom ash treatment

THURSDAY OCTOBER 12
MORNING

SESSION E9 / BIANCA HALL FOYER / 9:00-10:30
WASTE LANDFILLING: CASE STUDIES
Chair / *Presidente:* Rainer Stegmann (DE)

M. Coldesina, R. Casazza (IT)
Flexible and convenient solution to monitor and model landfills with real application

C.K. Vidanaarachchi, B. Dearman (AU)
Landfill gas lateral migration management: case study

R. Gregory (UK)
Hydrogen sulphide generation and emission in landfills: new wastes, new challenges

A. Salih (AU)
Discovering old mine shafts under a new landfill cell

T. Sperling, A. Abedini, T. Thalhammer (CA)
New science in landfill fire control - Extinguishing the Caton landfill fire

10:30 - 11:00 Coffee break

SESSION E10 / BIANCA HALL FOYER / 11:00-12:30
WASTE MANAGEMENT CASE STUDIES
Chair / *Presidente:* Giorgio Bertanza (IT)

M. Nenkovic-Riznic (RS)
Micro-location analysis in municipal solid waste management – Comprehensive use of GIS in the Serbian villages

S. Kissoon, C. Trois (ZA)
An assessment of the impact of policy interventions for organic waste in the City of Cape Town

P. Kafasis, K. Tsioptsias, P. Papagoras (GR)
The integrated Waste Management System of Western Macedonia (IWMS), Greece

A. do Carmo Precci Lopes, T. Hagedorn, A. Schlüte, B. Boeddinghaus, B. Völker, E. Ionescu, L. Wenzel, M. Cornelli, S. Mehmood, C. Binnig, L. Schebek (DE)
Closing material loops through optimized communication among stakeholders of the circular economy: an example from the chemical industry

SESSION F9 / NATURISTA HALL / 9:00-10:30

WORKSHOP: WASTE MANAGEMENT IN SOUTH-EASTERN COUNTRIES

Chair / *Presidente:* Kerstin Kuchta (DE)

The scope of this workshop is to show the results obtained from the SWAP (Sustainable solid WAste management and Policies) project, which aim is to support capacity building in higher education in the field of solid waste management as well as technical and vocational training of waste practitioners in Vietnam, Thailand and Cambodia.

Introductory lectures:

M. Kitzberger, K. Kuchta - Hamburg University of Technology (DE) / Capacity building in municipal solid waste management in Asian countries of Vietnam, Cambodia and Thailand: the state of the art and the case of the Erasmus+ "SWAP" project

C. Muzzi - Institute for Training of Business Operators (IT) / Achieving sustainability in capacity building projects: sharing educational products and tools in the SWAP project

S. De Gisi - Polytechnic University of Bari (IT) /Discussing the possibility of extending the European vision of solid waste management to the Asian countries of Vietnam, Cambodia and Thailand

10:30 - 11:00 Coffee break

SESSION F10 / NATURISTA HALL /11:00-12:30

WORKSHOP: CIRCULAR CONSTRUCTION IN REGENERATIVE CITIES

Chairs / *Presidenti:* K. Kuchta, J. zum Brock (DE)

The development of large and attractive metropolitan regions needs to be supported by the sustainable growth of their built environment. The workshop aims to explore the latest developments in creating circular and regenerative cities and to present the progress achieved so far in the H2020 funded project CIRCuIT. Presentations will cover topics such as circular construction, the current development in the use of recycled concrete in Hamburg, the current development in respect of pre-demolition audits.

Introductory lectures:

K. Kuchta, J. zum Brock (DE) / Introduction to the workshop

M. Doostdar (DE) / CIRCuIT Circular construction in Regenerative Cities

J. zum Brock (DE) / Introduction to the process of pre-demolition audits

A. Morales Rapallo (DE) /Recycled concrete - Challenges and Opportunities

M. Doostdar (DE) / Environmental impact of recycled aggregates in Hamburg

THURSDAY OCTOBER 12
MORNING

SESSION G9 / PINETA HALL / 9:00-10:30
WORKSHOP: PFAS REMOVAL FROM CONTAMINATED MATRICES

Chairs / *Presidenti:* Jurate Kumpiene, Ivan Carabante (SE)

Despite the efforts to ban or restrict the use of per- and polyfluoroalkyl substances (PFAS), they are still found in products, wastewater, waste and landfill leachate. Due to their persistence, PFAS circulation in the environment is expected to last for many decades even after their ceased use. The extent of PFAS contamination and the awareness of their risks have been driving the development of treatment techniques. Most of the technologies that are considered when managing PFAS-containg waste and leachates are based on retardation of PFAS spreading through adsorption on e.g. reactive carbon. This principle is partly effective as not all PFAS molecules have affinity for organic matter and also requires further management of sorbents. Techniques that could cost-effectively destroy PFAS chemicals are highly relevant and sought by owners of waste management facilities, contaminated sites and remediation technology companies and thus urgently need to be developed. Joint efforts of experts of various disciplines are necessary to address this challenge of removing PFAS from circulation.
Outcomes have a high value for the society at large and the entire environment. In this workshop, issues related with the management of PFAS contaminated materials and method that are being developed are going to be presented and discussed.

Introductory lectures:

I. Carabante (SE)
Introduction to the workshop: challenges with managing PFAS-contaminated solid waste

A. Kihl (SE)
Management of PFAS-contaminated masses at Ragn-Sells waste management facilities

10:30 - 11:00 Coffee break

SESSION G10 / PINETA HALL / 11:00-12:30

WORKSHOP: POTENTIAL OF CANDIDATE MATERIALS FOR METHANE OXIDATION SYSTEMS

Chairs / *Presidenti:* Julia Gebert (NL), Marion Huber-Humer (AT)

During the past years more and more full-scale methane oxidation systems have been implemented on landfills to reduce methane emissions, benchmarking the transition from research and pilot scale to full field application. Successful system design involves the selection of suitable materials (e.g. mineral soils, compost) of a high CH_4 oxidation potential. Also, it can be of interest to assess the potential of materials already in place in operational CH_4 oxidation systems.
Research into microbial CH_4 oxidation has seen the application of many different field and laboratory methods to quantify a soil9s CH_4 oxidation potential. They vary from small scale batch to meso-scale column tests to gas push pull tests in the field. Boundary conditions vary, for example with regard to feed gas concentrations, moisture content, temperature, compaction state of the material, duration of experiment etc., as does the interpretation of the data.
To date, a standardized approach is still missing, which makes comparison difficult. The main purpose of the proposed workshop is therefore to discuss methods for the assessment of the CH_4 oxidation potential of materials intended for use in CH_4 oxidation systems or already in place.
As main outcome it is intended to provide an overview of currently applied methods, to identify their limitations and benefits, the variables impacting the result, and to define the possible needs for method harmonization.

Introductory lectures:

A. Cabral (CA)
The role of methane oxidation capacity in the design of methane oxidation systems and challenges related to its determination in a timely basis

J. Gebert (NL)
Factors impacting assessment of the methane oxidation capacity – Batch studies

M. Huber-Humer (AT)
Challenges and impacting factors during operation of methane oxidation columns

C. Scheutz (DK)
Case study for application of batch tests to assess methane oxidation potential for the Danish Biocover Initiative

THURSDAY OCTOBER 12
AFTERNOON

ACTIVE LAB 09 / FOYER CONGRESS CENTRE / 9:00-10:30
WASTE MANAGEMENT STRATEGIES IN VIEW OF MATERIAL AND ENERGY SYSTEM TRANSITION

Organised by / *Organizzato da:*
David Laner, Center for Resource Management and Solid Waste Engineering, University of Kassel (DE)
Valentina Bisinella, Department of Environmental and Resource Engineering, Technical University of Denmark (DK)

Current global environmental challenges, such as climate change, clean energy provision and responsible consumption and production, require society to urgently transition to more sustainable solutions across all sectors with fundamental, transformative, and cross-cutting changes. This is true for the waste management sector as well as for other sectors such as energy and material production, which are heavily linked to waste management and subject to particularly drastic changes. These changes need to be reflected in environmental decision support tools, most prominently in LCA, in order to identify and implement environmentally sound waste management schemes, optimal for the time when they are design and robust in view of future conditions in which they will operate. However, despite the need for comprehensive studies on the effect of system changes on environmentally preferable waste management solutions, so far there is hardly any research on the specific challenges for prospective LCAs on future waste management systems. The aim of the active Lab is to address challenges and uncertainty related to future transformations of energy and material systems and how they can be reflected in prospective LCA on waste management. The activity will initiate talks in order to identify research and framework-creation opportunities in this area.

1st part - Presentations:

- *David Laner (DE)* / Identifying environmentally robust waste system configurations
- *Valentina Bisinella (DK)* / Waste LCA and the future
- *Sarah Schmidt (DE)* - Current and future key factors for the environmental performance of plastic packaging waste management
- *Thomas Christensen (DK)* / The future challenges of waste management
- *Anna Sofie Varling (DK)* / Emerging technologies in waste management systems: carbon capture, storage and utilization applied to incineration and anaerobic digestion

2nd part - Structured discussion with group works for identifying environmentally robust strategies

ACTIVE LAB 10 / FOYER CONGRESS CENTRE / 11:00-12:30

METHODS AND APPROACHES TO QUANTIFYING REUSE AND AVOIDANCE OF WASTE

Organised by / *Organizzato da:*
Peter Shaw, Ian D. Williams - University of Southampton (UK)

The aspirations of waste management are well known and clearly expressed, notably in the form of the Waste Hierarchy and Circular Economy. Determining the rate of progress made towards waste hierarchy and circular economy goals varies in terms of the established methods and approaches. Quantities of materials in waste streams that are destined for landfill, incineration or recycling are routinely recorded; the means to achieve this are in general established and simple. Data acquired via weighbridges, for example, provide a simple and robust record of tonnages of materials received by waste management facilities. Likewise, data appertaining to sales of sorted materials from materials recycling facilities are easily recorded and provide mostly accurate and reliable data relating to recycling. But how do we assess achievements and success in relation to other ambitions in waste management? How do we determine if and how our efforts are leading to increased levels of reuse? How do we measure the impacts of our efforts to prevent or avoid waste? How do we assess progress towards circular economy ambitions? These challenges will be addressed through a participatory workshop in which delegates will be challenged to identify, develop, or create ways to achieve these critical objectives and ambitions.

THURSDAY OCTOBER 12
AFTERNOON

SESSION A11 / CENTRAL HALL / 15:00-16:30
INNOVATIVE RECYCLED MATERIALS FROM WASTE

Chair / *Presidente:* Mariachiara Zanetti (IT)

T. Sattler, K. Doschek-Held, A. Krammer, D. Vollprecht (AT)
Recycling of mineral wool waste into a new mineral wool

V. Zepic Bogataj, P. Fajs, C. Peñalva, G. Tsatsos (SI)
Citrus peel waste fibres for natural cosmetic and bioplastic packaging

C. Olscher, A. Tolentino, D. Peral, F. Part (AT)
An innovative process for designing safe and sustainable epoxy-based composites for automotive and aerospace

S. Schmuck, C. Meyer, V. Preyl (DE)
Agricultural systems of the future: Rural-Urban Nutrientship (RUN)

H. Wang, D. Yue (CN)
Can residual of landfill leachate evaporation be used to modify g-C3N4?

V. Kaplan, E. Wachtel, I. Lubomirsky (IL)
Recovery of lithium and heavy non-ferrous metals from spent lithium-ion batteries

M. Vaccari, D.S. Premathilake, A.B. Botelho Junior, F. Colombi, J. Tenorio, D. Espinosa (IT)
Exploring the potential of repurposing waste graphite obtained from the recycling of end-of-life lithium-ion batteries for wastewater treatment applications: preliminary results

16:30 - 17:00 Coffee break + Poster discussion

SESSION B11 / CENTRALL HALL 2 / 15:00-16:30

MICROPLASTICS IN DIFFERENT ENVIRONMENTS

Chair / *Presidente:* Aldo Muntoni (IT)

F. Wei, Q. Tan, Y. Chen, J. Li (CN)
Mechanical recycling of plastic waste: a neglected source of microplastic

F. Lou, J. Wang, Q. Huang (CN)
Mass concentration and distribution characteristics of microplastics in landfill mineralized refuse

T.P. Vo, J. Rintala, C. He (FI)
The mitigation of typical microplastics in sewage sludge via hydrothermal process

J. Yoo, M. Nomura, S. Oleszek, R. Homma, K. Oshita, M. Takaoka (JP)
Heavy metals and microplastics interactions: insights from batch experiments

A. Jančauskas, R. Skvorčinskienė, I. Kiminaitė, L. Vorotinskienė, R. Paulauskas (LT)
Bioplastic degradation under real-life conditions: characterization by FTIR-ATR and FTIR-TGA methods

16:30 - 17:00 Coffee break + Poster discussion

SESSION C11 / PANORAMA HALL / 15:00-16:30

ADVANCED WASTEWATER TRETAMENT

Chair / *Presidente:* William Clarke (AU)

N.O. Sanjeev, E.V. Aswathy (IN)
Effect of operational parameters on photocatalytic removal of acetaminophen using green synthesized zinc oxide nanoparticle

A. Abhiram, N.S.B. Virinchi, N. Sai Chandra, S. Saji Bibin, T.S. Anantha Singh, G.K. Varghese (IN)
Removal of phenol from waste water using fenton process

D. Jang, J. Won, S. Kang, A. Jang (KR)
Effects of different bio-carriers in moving bed biofilm reactors for high-strength nitrogen wastewater treatment

K.K. Basaira Thamanna, A.K. Anjana, A. Gautam, Anusree, T.S. Anantha Singh,

E.V. Aswathy (IN)
Avocado seed and custard apple seed as natural coagulants for the treatment of grey water

V. Grossule, M.C. Lavagnolo (IT)
Wastewater treatment by using Black Soldier Fly larvae: principles & results

M. Domini, G. Bertanza (IT)
Waste minimisation in wastewater treatment: the potential of aerobic stabilization in drastic sludge reduction

16:30 - 17:00 Coffee break + Poster discussion

THURSDAY OCTOBER 12
AFTERNOON

SESSION D11 / EX CHIESA HALL / 15:00-16:30
CARBON CAPTURE BASED PROCESSES

Chair / *Presidente:* Christopher Eden (UK)

S. Andersson, M. Biermann (SE)
Gas pretreatment for CCS in Waste-to-Energy plants

B. Zach, J. Pluskal, J. Jadrny, R. Somplak, J. Kudela, M. Syc (CZ)
Energy demands of membrane-based carbon capture at a waste-to-energy plant

K. Elyasi Gomari, S. Rezaei Gomari, D. Hughes, T. Galadanchi Ahmed (UK)
Characteristic of CO_2 sequestration in steel slag wastes at elevated temperature and longer contact time

A. Masi, G. Costa (IT)
Investigation of carbonation-based processes to obtain products from industrial alkaline residues while storing CO2 in the framework of the BBCircle project

16:30 - 17:00 Coffee break + Poster discussion

SESSION E11 / BIANCA HALL FOYER / 15:00-16:30
LANDFILL MINING

Chair / *Presidente:* Raffaello Cossu (IT)

C. Camolesi Guimarães, A. Muselli Barbosa, E. dos Santos Rosa Bezerra, G. Paulino Pereira, L. Guireli Netto (BR)
Assessment of the landfill mining potential in inactive landfills in the State of São Paulo, Brazil

P. Tan, W. Giacetti, R. Raga, E. Villani (IT)
Landfill remediation by landfill mining - Case study of the Villadose landfill

S. D'Haene, S. Pensaert, D. Mosca (BE)
Remediation by landfill mining of the Slettebakken landfill in Bergen, Norway

M. Zari, R. Smith, R. Ferrari (UK)
Evaluation of dust emission rate from landfill mining activities

16:30 - 17:00 Coffee break + Poster discussion

SESSION F11 / NATURISTA HALL / 15:00-16:30

WORKSHOP: FROM BIOWASTE COLLECTION TO HIGH QUALITY COMPOST

Chair / *Presidente:* Christian Zafiu (AT)

Biogenic waste represents the largest fraction of municipal solid waste that should be separately collected and used to produce biogas or compost. Composts can be used as a sustainable fertilizer and soil conditioner respectively. However, impurities reduce the quality of composts and must be avoided as much as possible. In particular, plastic pollution that enters the biogenic waste treatment process will be fragmented and will generate microplastics that cannot be removed from the composts anymore and thus are transferred to soil and the environment.
However, even if impurities can be reduced at any stage of the collection and treatment process the initial collection and avoidance remains the best option to reduce impurities. For the avoidance of impurities it is important to know, which impurities – down to the waste item – were inappropriately disposed of in the separately collected biowaste. In the compost plant, impurities can be removed only partly during pretreatment by different technical solutions, as well as after the composting process.

Introductory lectures:

P. Beigl (AT)
Gamechanger biogenic waste? A guideline for representative sampling with consideration of impurities, biodegradables and food waste

E. Binner (AT)
Austrian regulations about impurities in feedstock material and composts

C. Zafiu (AT)
Macro- and microplastic pollution in composts and the transfer to agriculture and environment

- Workshop / group discussion ("world café" with 3 groups – i. Avoidance strategies, ii. New technologies and possible regulations to reduce pollution iii. Plastic pollution in composts and soils)
- Presentation of group outcomes
- Summary of workshop and outlook

16:30 - 17:00 Coffee break + Poster discussion

THURSDAY OCTOBER 12
AFTERNOON

SESSION G11 / PINETA HALL / 15:00-16:30
WORKSHOP: SEMI-AEROBIC LANDFILLING: ONLINE TECHNOLOGY TRANSFER

Chairs / *Presidenti:* Yasushi Matsufuji, Ayako Tanaka (JP)

Due to the global warming, large-scale natural disasters have occurred in many countries in recent years, giving rise to major social concerns. The Waste problem have become very serious in the African and the Asian region.
The authors received the projects from the United Nations Human Settlements Program (UN-Habitat) Regional Office for Asia the Pacific-Fukuoka related to "technical support regarding landfills using the Semi-aerobic landfill concept (Fukuoka Method)".
In this workshop, the authors would like to introduce their experience with these projects for stabilization and rehabilitation of existing landfills and construction of the Semi-aerobic Landfills in African and Asian Regions by sharing the progress photos and the design drawing, and instruction using technical manual and video created by SWAN member in the regualar On-Line meeting during Covid-19 pandemic and also would like to discuss as follows:

Introductory lectures:

Y. Matsufuji, A. Tanaka (JP)
Toward an appropriate technology transfer of Fukuoka Method

S. Hoshino, T. Umeki, A. Tanaka, Y. Matsufuji (JP)
Project for Improvement and Construction by Semi-aerobic landfill concept in Yangon, Myanmar

M.C. Lavagnolo (IT)
Effective learning centered education during COVID19 pandemic for the master degree in Environmental Engineering at ENSTP, Yaounde

A. Tanaka, T. Umeki, Y. Matsufuji (JP)
Trial of online training for leachate and gas monitoring in oversea support project

T. Mito, S. Hoshino, A. Tanaka, Y. Matsufuji (JP)
Current status of future challenges of technology transfer - Case studies in Asia and Africa

16:30 - 17:00 Coffee break + Poster discussion

ACTIVE LAB 11 / FOYER CONGRESS CENTRE / 15:00-16:30

SATELLITE DATA AND LOW-COST GAS SENSORS LANDFILL MONITORING PLATFORM

Organised by / *Organised by:*
Yuri Ponzani - Cleannovation (UK)
Laura Capelli - Politecnico di Milano (IT)

The ESCAPE project aims to develop a new service, a cloud-based online platform, combining space-based and ground datasets, including meteorological data, with AI-based solutions and algorithms for spotting emissions and pollution from landfill and brownfield sites.
ESCAPE builds on the:

- Creation of analysis models of Earth Observation (EO) products that allow the identification of features and/or anomalies in the areas of interest
- Development of a new gas-sensing device (Sensors Toolbox) to screen pollutant gasses concentrations in ambient air during walkover surveys (reconnaissance surveys)
- Development of a new digital platform available as a Software as a Service solution combining multiple data sources.

The active lab will describe remote sensing and pollutants analysis with low-cost sensors at landfills and waste treatment plants. It will present specific challenges associated with the real-time monitoring of pollutants in the field, mainly focusing on the management of interferences.
Participants will be dealing with selected case studies, illustrating experimental procedures and machine learning methods specifically designed for interference mitigation and their application to real-case scenarios, and they will be challenged with dedicated practicals and hands-on activities involving the application of compensation algorithms to real field data.

Agenda:

Y. Ponzani (UK)
Remote Sensing over Landfill and Brownfield Sites

L. Capelli, C. Bax (IT)
Detecting pollutant gases and odours at landfills and waste treatment facilities with low-cost gas sensors

C. Ratti (IT)
Dealing with interferents when using gas sensors for environmental monitoring: examples and case studies

Y. Ponzani (UK)
Objectives of the ESCAPE Project

16:30 - 17:00 Coffee break + Poster discussion

THURSDAY OCTOBER 12
AFTERNOON

FOCUS SESSION III

CENTRAL HALL / 17:00-18:30

REUSE, UPCYCLING, DOWNCYCLING, SIDECYCLING, BICYCLING: WHERE TO GO?

Moderator:

Jurate Kumpiene - Luleå University of Technology (SE)

Panelists:

Uta Jenull - Montanuniversität Leoben (AT)
Timo Lange - Hamburg University of Applied Sciences (DE)
Akira Otsuki - Universidad Adolfo Ibáñez (CL)
Bettina Rutrecht - K1-MET GmbH (AT)
Stefan Salhofer - BOKU University of Natural Resources and Life Sciences Vienna (AT)

What sets upcycling, downcycling, and recycling apart? While upcycling and downcycling fall under the umbrella of recycling, they do not all hold the same value.
When we transform discarded items into something of higher or comparable value, we "upcycle." Conversely, when a material or product is converted into something of lesser value, it is "downcycled". For example, surplus materials can be upcycled to create a product with greater value than the original components. In contrast, downcycling comes into play when waste materials are repurposed into something of reduced value. Plastic recycling often falls into the downcycling category as the end product tends to be of lower quality.
Preferably, upcycling outperforms downcycling due to its ability to extend the lifespan of materials. The creation of new materials necessitates substantial resources such as water and energy. By prolonging the use of existing materials, the requirement for new material production is postponed or even avoided. As a result, valuable resources are preserved.
Both upcycling and downcycling are integral to a "closed-loop" manufacturing system. Nonetheless, the extent to which various industries operate within such a system remains a pertinent question.
What is needed to facilitate the true “closed-loop” development? What good examples are already there?

THURSDAY OCTOBER 12
SOCIAL EVENT

SARDINIA'S GOT TALENT
Piazza Maria Luigia, h. 21:30

Following the huge success of the 2019 edition, "Sardinia's Got Talent" returns: an entertaining night in which delegates can go on stage to show their talents, accompanied by a live band which will make us dance after the talent show.
If you can sing, play an instrument, dance or have any other talent you wish to share, the stage is all yours!
The audience in the Piazza will vote for the best performance with our symposium app. The Austrian delegation will perform during the Sardinia's Got Talent. The night will continue with live music and dancing.
Please contact us at info@sardiniasymposium.it or **stop by the registration desk by Thursday to sign up for the show**.
Rehearsals will be held on Thursday afternoon!

Free event for symposium delegates and accompanying persons.

DAY 5 / FRIDAY
OCTOBER 13

FRIDAY OCTOBER 13
MORNING

SESSION A12 / CENTRAL HALL / 9:00-10:30
HYDROTHERMAL CARBONIZATION OF WASTE

Chair / *Presidente:* Sven Andersson (SE)

N.D. Berge, A. Sarrion, E. Suarez, J.M.R. Flora , J.R.V. Flora, R. Goal, L. Liu, E. Diaz, A.F. Mohedano (US)
Developing environmentally beneficial strategies for the hydrothermal carbonization of food waste

A. Bialowiec, E. Sygula, M. Hejna (PL)
The evaluation of waste-based biochar potential in Poland

C. He, A. Giannis (FI)
Hydrothermal co-carbonization of sewage sludge and food wastes towards sustainable biowaste management and NOx emission reduction

Y. Shao, W. Lu (CN)
Acid hydrothermal solution recycling enhanced alkaline hydrothermal humification of hydrochar

10:30 - 11:00 Coffee break

SESSION A13 / CENTRALL HALL / 11:00-12:30
PRODUCTS FROM HYDROTHERMAL CARBONIZATION OF WASTE

Chair / *Presidente:* Massimiliano Materazzi (UK)

D. Moloeznik Paniagua, J.A. Libra, S. Rotter (DE)
Hydrochar from digestate: assessment of its soil amendment feasibility, repeatibility and comparison of heavy metals determination

I. Moukazis, F. Simantiraki, E. Gidarakos (GR)
Microwave hydrothermal carbonization of rabbit manure: characterization and potential phytotoxicity of the products

M. Hejna, A. Bialowiec (PL)
Carbonized solid fuel obtained by torrefaction of MSW: emissions of VOCs

E. Sygula, A. Bialowiec (PL)
Wooden waste-derived biochar as a source of volatile organic compounds emission

SESSION B12 / CENTRALL HALL 2 / 9:00-10:30

MATERIAL FLOW ANALYSIS AND CARBON FOOTPRINT IN WASTE MANAGEMENT

Chair / *Presidente:* Alberto Pivato (IT)

G. Hafner (DE)
Method development for the provision of basic data for material and substance flow analyses in waste management

K.R. Mattson, L. Lindgreen Lauritsen, J. Berg Pettersen (NO)
Material and embedded GHG emission flows of electronic waste treatment in Norway

G. De Feo, C. Carotenuto, A. Grosso (IT)
MSW regional and national mass flow analyses used as tools to verify the integrated waste management strategy: the case study of Italy

S. Zhang, J. Li, Q. Tan (CN)
An input-output material flow analysis model for deriving the embedded plastics in China

L. Zhang, H, Li (CN)
Carbon footprints of recycling milk carton

A. Kihl, Y. Cohen (SE)
Recovery of high-grade salts from Air Pollution Control Residues 3 first large scale Ash2®Salt plant in Sweden

10:30 - 11:00 Coffee break

SESSION B13 / CENTRALL HALL 2 / 11:00-12:30

ENVIRONMENTAL IMPACT ASSESSMENT IN WASTE MANAGEMENT

Chair / *Presidente:* Goerge K. Varghese (IN)

J. Zeilinger, M. Huber-Humer (AT)
Circularity and sustainability of temporary housing facilities - Challenges and opportunities of environmental assessments

Y. Gu, X. Gao (CN)
Environmental risk assessment near a typical spent lead-acid battery recycling factory in China

L. Grabuschnig, J. Fellner, S. Bindreiter (AT)
Environmental impact assessment of different modifications of the Viennese building stock

T. Liu, Q. Zhang, J. Cao (CN)
Environmental impact and cost-benefit analysis of municipal solid waste collection, transportation and treatment system in Beijing, China

FRIDAY OCTOBER 13
MORNING

SESSION C12 / PANORAMA HALL / 9:00-10:30
SOIL REMEDIATION

Chair / *Presidente:* Thierry Gisbert (FR)

M. van Praagh, J. Jennerheim, C. Marburger, M. Hansson, E. Hammer (SE)
Effects of urban contaminants and reclaimed materials on soil functions

A. Khandelwal, M. Shrivastava (IN)
Rice growth and soil enzyme activities in lead contaminated Inceptisol

L. Priya, G. K. Varghese (IN)
Source apportionment of heavy metals and organic compounds at a contaminated site using Monte Carlo Analysis

K. Zheng, H. Wang (CN)
Pollutant treatment performance of Passive Convergence-Permeable Reactive Barrier (PC-PRB): a case study

A.G. Bindu, E.V. Aswathy, G.K. Varghese (IN)
Depositions from air on soil present an efficient forensic tool to establish past air pollution incidents

T. Ambaye, A. Franzetti, A. Bava, L. Mellere, M. Vaccari (IT)
Treatment of hydrocarbon-contaminated soil with biosurfactants obtained from agricultural waste

M. Somani (EE)
Challenges associated with the remediation of high organic soils

10:30 - 11:00 Coffee break

SESSION C13 / PANORAMA HALL / 11:00-12:30
PACKAGING WASTE: RECYCLING

Chair / *Presidente:* Johann Fellner (AT)

D. Blasenbauer, A-M. Lipp, J. Fellner, J. Lederer (AT)
Assessment of the recovery potential of recyclables via automated sorting of municipal solid waste – A case study from Austria

A.-M. Lipp, D. Blasenbauer, J. Lederer (AT)
Status, lack and increase potentials of recycling rates for packaging waste: a aase study from Tyrol, Western Austria

Z.K. Chong, K. Kuchta (DE)
Recycling of polyolefin packaging for food applications: requirements and gaps

A. Paini, G. Vignali (IT)
End-of-life modelling and environmental evaluation of paper packaging waste

G. Cali, F. Parrillo, C. Boccia, F. Ardolino, E. Maggio, A. Pettinau, U. Arena (IT)
Performance characteristics of a pilot-scale plastics waste gasifier using oxygen-enriched air and steam

SESSION D12 / EX CHIESA HALL / 9:00-10:30

PERFORMANCE OF COVERS VS LANDFILL LIFETIME

Chair / *Presidente:* Daniele Cazzuffi (IT)

K. Berger, E. Mysina, A. Eschenbach (DE)
Impact of the projected climate change on the water balance of landfill cover systems in Germany - Simulation results of HELP 3.95 D

F. Molema, H. Geusebroek, R. van Wijhe (NL)
Assessment of the durability of Dutch landfill covers, a case study of Bavel

X. Bai , D. Huang, Q. Xu (CN)
Biochar for methane mitigation in landfill cover: properties and mechanisms

A.K. Martins Morita, I. K. Sakamoto, M.B.A. Varesche, E. Wendland (UY)
Capping of old unlined landfills: shifts on microbial populations and contributions to metals precipitation

G. Viti, A. Randazzo, S. Venturi, F. Tatàno, F. Tassi (IT)
Attenuation of volatile inorganic and organic compounds in landfill cover soils treated with sewage sludge and landfill leachate

R.N. Michael, T.D.H. Kim, R. Fernando (AU)
Plant selection for landfill phytocaps: Australian case studies

10:30 - 11:00 Coffee break

SESSION D13 / EX CHIESA HALL / 11:00-12:30

AFTERCARE AND SUSTAINABILITY OF LANDFILLS

Chair / *Presidente:* Raffaello Cossu (IT)

N. Ruxton, A. Noviani (AU)
Sustainable landfill design in a climate of change

A. De Vocht, T. Smeets, W. De Witte, L. Van Doninck (BE)
Restoring landfill covers into Natura 2000 habitats and biotope for EU-protected species

V.R. Chulliparambil, H. Shearer, T. Matthews, J. Cortes Ramirez, R. Michael (AU)
GIS to identify the value of ecological rehabilitation of landfills

C. Nieto, E. Vazquez-Suñè, J.J. Velasco (CO)
Evaluation of groundwater hydrology system associated with a landfill in Colombia

T. Singh Bisht, D. Kumar, B. J. Alappat (IN)
Effect of landfill age and rainfall on pollution potential of landfill leachate

FRIDAY OCTOBER 13
MORNING

SESSION E12 / BIANCA HALL FOYER / 9:00-10:30

WORKSHOP: TOOLS FOR EVALUATING THE REAL CONVENIENCE OF RECYCLED MATERIALS

Chairs / *Presidenti:* Maria Cristina Lavagnolo, Giovanni Beggio (IT)

Organised by: WE-Waste End project, MICS (Made in Italy – Circular and Sustainable) Extended Partnership
Received funding from Next-GenerationEU (Italian PNRR – M4 C2, Invest 1.3 – D.D.1551.11-10-2022, PE00000004)

Despite being promoted as a key tool to ease the transition to a circular economy, the definition of unique and centralised EU End-of-waste criteria was not as successful as planned. First, the process is currently decentralised and left to the local authorities, which lack the capacity to identify the qualitative and quantitative information needed for its definition and assessment. Further, no data are always available to base decision on the real convenience of recycled products when compared to the life cycle of nonrecycled ones (...) *Full appetizer available on the website.*

Introductory lectures:

M.C. Lavagnolo – University of Padova (IT) / MICS and the "Waste End Project"

C. Castiglioni – Polytechnic University of Milan (IT) / The importance of generating data about "extensive material characterization" during different life stages of the materials. Chemical composition and modifications, molecular structure and material morphology by means of spectroscopies (IR, Raman, NIR, UV-visible, etc.) microscopies, thermal and mechanical tests

G. Beggio – University of Padova (IT) / The proposition of scientifically-sound approaches useful to understand, define and assess the "environmental impacts" of recycled materials according to their scope of application

P. Gallo Stampino – Polytechnic University of Milan (IT) / The need to expand the scope of LCT tools (LCA, S-LCA, LCC) by including the impacts derived from the "second life" of recycled materials (e.g., production, usage and after-usage fate) to make use of LCA results

G. Bertanza – University of Brescia (IT) / How industrial symbiosis analysis can highlight the role of reliable and convenient End-of-Waste criteria in the promotion of local circular economy frameworks

P. Dzoh Fonkou – University of Padova (IT) / Case studies: plastics

N. Aversano – Thales Alenia Space (IT) / Approach to sustainability in Space products

10:30 - 11:00 Coffee break

SESSION E13 / BIANCA HALL FOYER / 11:00-12:30

WORKSHOP: OPEN ISSUES IN EU REGULATIONS ON END OF WASTE

Chair / *Presidente:* Maria Pettersson (SE)

Introductory lectures:

O. Johansson (SE)
Must the discourse change? – A review of CJEU Waste Case Law 2012-2023

M. Zanetti, D. Panepinto (IT)
Analysis of the End of Waste (EoW) criteria

K. Kenk, M. Kriipsalu, K. Kerge (EE)
By-product and end-of-waste technologies', policy implications and management decision triggers for sustainable and circular use of bioresources across agriculture, forestry, and aquacultur

FRIDAY OCTOBER 13
MORNING

SESSION F12 / NATURISTA HALL / 9:00-10:30
WORKSHOP: EVALUATION OF FOOD WASTE PREVENTION

Chair / *Presidente:* Gudrun Obersteiner (AT)

Food waste prevention measures at different stages of the food value chain have been implemented for many years in different countries. The evaluation of these measures should be part of every activity in order to be able to represent the actual success. Especially in the area of consumers, who are responsible for about 50% of all food waste produced, and in view of SDG 12.3, which among other things envisages a halving of food waste at consumer level (as well as retail level) by 2030, an actual quantification of the prevention activities carried out is essential. The aim of the workshop is therefore to present evaluated activities for the prevention of food waste and to discuss the criteria that constitute successful, measurable prevention of food waste.

Introductory lectures:

G. Obersteiner (AT)
Introduction to the workshop – Evaluation criteria

E. Schmied (AT)
Evaluation of food waste prevention measures at retail

K. Watanabe (JP)
Evaluation of food waste prevention measures at home

T. Okayama (JP)
Evaluation of food waste prevention measures out of home

G. Obersteiner (AT)
Evaluation of food waste prevention measures in agriculture

Interactive discussions:
Discussion 1: Evaluation criteria (how did you measure the effects) – what might help for the future?

Discussion 2: Best practice (what interventions worked?) and KPIs

10:30 - 11:00 Coffee break

SESSION F13 / NATURISTA HALL / 11:00-12:30

WORKSHOP: CIRCULAR ECONOMY IN THE MEDITERRANEAN AREA

Chair / *Presidente:* Oumaya Yazoghli-Marzouk (FR)

A. Abou Jaoude, I. Srour, O. Yazoghli-Marzouk (LB)
Factors influencing CDW policies and strategies in Lebanon

A. Abou Jaoude, I. Srour, N. Hamdi, O. Yazoghli-Marzouk (LB)
CDW state of the art and action strategy- the case of Lebanon and Tunisia

G. Di Mino, O. Yazoghli-Marzouk, R. Idir, P. Vaillant (IT)
Recycling Construction and Demolition waste and Reclaimed Asphalt in the road sector with a view of the Circular Economy. The boundaries, regulations and perspectives in developed countries

A. Abou Jaoude, O. Yazoghli-Marzouk, I. Srour, N. Hamdi (FR)
Knowledge transfer as a driver to sustainable development - The RE-MED project experience

R. Idir, Z. Jaouadi, O. Yazoghli-Marzouk (FR)
Life cycle assessment of the first road constrcuted in Tunisia including recycled aggregates

FRIDAY OCTOBER 13
MORNING

SESSION G12 / PINETA HALL / 9:00-10:30
WORKSHOP: LANDFILL GAS MANAGEMENT TO MEET METHANE REDUCTION TARGETS FOR 2030

Chair / *Presidente:* Peter Kjeldsen (DK)

EU has shown little progress over the last twenty years in reducing the overall methane emission from their waste disposal sites, despite straight rules were given in the 1999 Landfill Directive. EU made a Methane Strategy in 2020 in order to boost the reduction of methane emission in the most important sectors; the agricultural, waste and energy sectors. However, reports from the European Environmental Agency show that the overall emission does not changed much over the years. The scope of the workshop is to identify why European LFG management not has reach larger improvements, and discuss how we can boost the LFG management in respect to policies, emission measurement implementation and better mitigation technologies.

Introductory lecture:

P. Kjeldsen (DK)
How to kick start the slow progress of the European LFG Management to reach mitigation goals in the Methane Pledge

10:30 - 11:00 Coffee break

SESSION G13 / PINETA HALL / 11:00-12:30
WORKSHOP: IMPLEMENTING MODERN WM STRATEGIES IN DEVELOPING COUNTRIES

Chair / *Presidente:* Islam Rafizul (BD)

Introductory lectures:

K.C. Grewan, C. Trois (ZA)
Navigating a pathway to the insertion of various waste technologies and their applicable institutional drivers and barriers in South Africa

P.K. Dagadu, G. Sagoe, M. Oteng-Ababio (GH)
Normative influence on intention to segregate household waste: reflections from a low-middle income city in sub-Saharan Africa

J.P. Dzoh Fonkou, C.P. Neba, M.C. Lavagnolo (IT)
Valorisation of plastic waste in the context of circular developing economy

C. Stander, J. Snyman (ZA)
Establishing a monitoring and evaluation framework for waste management strategies in South Africa

ACTIVE LAB 12+13 / FOYER CONGRESS CENTRE / 9:00-12:30

BLACK SOLDIER FLY LARVAE: A FULL WEEK TEST FOR BIOWASTE TREATMENT
PART 2: LARVAE SEPARATION AND PERFORMANCE ASSESSMENT

Organised by / *Organizzato da:*
Marco Meneguz - BEF Biosystem (IT)
Valentina Grossule - University of Padova (IT)

In the context of the Circular Economy, the use of Black Soldiers Fly (BSF) for biowaste treatment represents a promising alternative to conventional biological processes, for either managing the waste and providing high value resources in term of materials and energy. Indeed, in the larval stage BSF are capable of metabolising and stabilising huge amounts of putrescible waste, transforming it into valuable biomass rich of proteins and fats, suitable for the direct use as animal food or for production of biorefinery products, such as proteins and, biodiesel, lubricants, chitin and chitosan, antimicrobial peptides.
The active lab aims at providing basics knowledge of the BSF larvae and on their use for biowaste treatment, including designing, feed quality, control parameters etc.
Practical activities will be divided into two parts:

- PART 1: set up of small-scale reactors for treatment of different biowaste, at the beginning of the conference. The reactors will be kept in operation and can be visited throughout the whole conference (Monday 9 October, 15:00 - 18:30)
- PART 2: closure of the test at the end of the conference with larvae separation and performance assessment (Friday 13 October, 9:00 - 12:30)

10:30 - 11:00 Coffee break

FRIDAY OCTOBER 13
AFTERNOON

FOCUS SESSION IV

CENTRAL HALL / 15:00-17:00

ROUND TABLE - ROLE OF WASTE MANAGEMENT IN MEETING SDGS

Moderator:

Marion Huber-Humer - BOKU University of Natural Resources and Life Sciences, Vienna (AT)

Considered Sustainable Developing Goals:

Food / Hunger (n. 2)
Health / Wellbeing (n. 3)
Sustainable Cities (n. 11)
Responsible consumption and production (n. 12)

Panelists:

Margherita Ferrante - University of Catania (IT)
Jutta Gutberlet - University of Victoria (CA)
Gudrun Obersteiner - BOKU University of Natural Resources and Life Sciences, Vienna (AT)
Michal Struk - Masaryk University (CZ)
Dongbei Yue - Tsinghua University (CN)
Ian Williams - University of Southampton (UK)

Already in the year 2016, the 17 Sustainable Development Goals (SDGs) of the United Nations´ 2030 Agenda for Sustainable Development officially came into force. Till the year 2030, countries worldwide shall mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change and other environmental challenges, while ensuring that no one is left behind. Big tasks, big responsibility, big challenges.
A global effort is needed that involves all diverse stakeholders and sectors to achieve these ambitious goals. This also applies to the waste management sector, which is explicitly addressed in some SDGs, and indirectly in others, but must make a no less important contribution.
The role of the waste management community in the challenges posed by the goals of the SDGs will be discussed with experts from different disciplines in this focused closing session. Future approaches to tackle these tasks and possible solutions are reflected in the context of waste management. Special focus will be put on SDG2 (Zero Hunger), SDG3 (Good Health and Well-Being), SDG11 (Sustainable Cities and Communities) and SDG12 (Responsible Consumption and Production).

FRIDAY OCTOBER 13
SOCIAL EVENT

GALA NIGHT: "Life for Waste 2023" Prize Ceremony, Gala dinner and Dancing Party/ PIAZZA MARIA LUIGIA AND SALA VERDE h. 19:30

To celebrate the closure of the conference week, all delegates are invited to a Gala Night, to be held in Piazza Maria Luigia and in the elegant Sala Verde next to the Oasi Swimming Pool.
The event will start on time at 19:30 with the **Prize Ceremony** of the "Life for Waste 2023 Award", the prestigious recognition given to individuals who have made an outstanding contribution to advances in international waste management research and technology. The Prize Ceremony will be attended by Christian Solinas, the President of the Sardinia Region, and other important authorities and personalities of the Scientific Community.
The event will continue with the traditional Gala dinner.

The access to the dinner is by invitation only. Tickets must be collected at the registration desk starting from Wednesday 11th October.
The cost of the Gala Dinner is included in the registration fee for Symposium delegates. Accompanying persons should purchase the ticket from the Secretariat
During the dinner "Best Papers Awards" will be presented and delivered to the winners of the different categories.
Live music will accompany the dinner and a dancing party will follow.

DRESS CODE: Formal dress

POSTER SESSIONS
SESSIONI POSTER

POSTER SESSIONS
SESSIONI POSTER

Poster presentations will be accessible to Symposium delegates at all times. Poster discussion will take place in the presence of authors in the afternoon from Monday to Thursday from 16:30 to 17:00.

Le presentazioni poster saranno sempre accessibili ai partecipanti al Simposio. La discussione dei poster avverrà alla presenza degli autori dal lunedì, al giovedì pomeriggio dalle 16:30 alle 17:00.

A. GENERAL ASPECTS

A01 / *L.S. Macedo, C.C. Guimarães, F.P. Manéo, C.E. Teixeira (BR)*
Regional integrated solid waste management planning in Brazil, main challenges and opportunities: case of the Metropolitan Region of Baixada Santista, São Paulo, Brazil

A02 / *M. Sharkey, W. Stubbings, M. Healy, S. Harrad, M. Coggins (IE)*
Synthetic organic contaminants in the Irish environment

A03 / *B. Silva, I. Costa, P. Santana, M.E. Zacarias, B. Machado, P. Silva, S. Carvalho, C. Basto-Silva (PT)*
Environmental impact assessment of water bottles with different compositions: vPET, rPET flake, and rPET pellet

A04 / *J.E. DeVoy (US)*
Environmental and gendered health effects of post-consumer textile waste

A05 / *C.C. Guimarães, M. Iocca Jr, F.M.R. Almeida (BR)*
Strategies for selective collection of recyclables and environmental education in small cities: a case study in Brazil

A06 / *B. Amante, A. Puig, JLL. Zamora, J. Moreno (ES)*
Robots in waste management

A07 / *E. Binner, C. Pfeifer, J. Lackner, C. Zafiu (AT)*
Challenges in the treatment of wood products in the context of circular economy

A08 / *A. Fernandez, I. Ferreira, X. Franco, J. Riaza, X. Serantes, V. Toca, S. Gómez-Cuervo, P. Villar, C. Ávila, L. Herrero (ES)*
Climate change vulnerability risk assessment methodology for waste management infrastructure from public and private perspectives

A09 / *N. Sundin, L. Bartek, C. Malefors, M. Eriksson (SE)*
Metabolic food waste - Hidden waste with a significant climate cost

B. RECYCLING AND RESOURCE RECOVERY

B01 / *A. Abdulkadhim Mohsin, K. Rassim Mahmood, A. Sleibi Mustafa, S. Naimi. S. Shatwan Yahya (IQ)*
Applying sewage sludge materials in improvement geotechnical properties of soils: a review

B02 / *E. Bietlot, C. Collart, E. Maron, R. Cuvelier (BE)*
Development of an innovative value chain for land infested by an invasive plant, the Japanese knotweed

B03 / *M. Kliukas, D. Vaičiukynienė, J. Mockienė, A. Kantautas, R. Bistrickaitė, D. Nizevičienė, V. Vaičiukynas, G. Stelmokaitis (LT)*
Development of sustainable Portland cement and reed composites

B04 / *F. Pasciucco, I. Pecorini, D. Gonzalez, O.J. Prado, D. Gabriel (IT)*
Life cycle assessment of an innovative biological treatment train for sulfur recovery from flue gases containing SOx

B05 / *H. Šnajdaufová, L. Morávková, F. Kaštánek, M. Čársky, K. Soukup, O. Šolcová (CZ)*
Pellets from sewage and paper mill sludge

B06 / *M. Tammaro, L.M. Cafiero, L. Tuccinardi, R. Tuffi (IT)*
Realization of a prototype of an experimental apparatus for End-of-Life photovoltaic panels recycling

B07 / *M. Holosová, A. Estoková, A. Sičáková (SK)*
Technological parameters of the cement composite with non-traditional waste

B08 / *A. Shestavetska, A. Augonis, A. Grinys, V. Vaitkevičius, A. Kantautas, I. Sapeha (LT)*
Utilization of MSWI bottom slag in the production of artificial aggregates by granulation technology

B09 / *N. Junakova, M. Balintova, J. Junak (SK)*
Reuse of reservoir sediments as a waste in the preparation of sustainable building mixtures

B10 / *L.B. Alves, B.B. Monteiro, R. de Almeida, J.C. Campos (BR)*
Humic substance recovery from reverse osmosis concentrate of solid waste landfill leachate treatment

B11 / *A. Nabavi-Pelesaraei, A. Damgaard, V. Bisinella (DK)*
Mini review on life cycle assessment of chemical recycling for polyethylene terephthalate packaging: a background for UPLIFT project

B12 / *D. Fontana, F. Forte, C. Marcoaldi, O. Masetti, V. Piergrossi, M. Pietrantonio, S. Pucciarmati, M. Tammaro (IT)*
Materials recovery from end-of-life electrochemical storage systems: preliminary results from the IEMAP project

B13 / *J. Eimontas, N. Striūgas, K. Zakarauskas, A. Jančauskas, L. Vorotinskienė (LT)*
The investigation of catalytic decomposition of waste fishing nets for energy products recovery

POSTER SESSIONS
SESSIONI POSTER

C. BIOREFINERY

C01 / *R. Tomczak-Wandzel, B. Szatkowska (NO)*
Bio-refinery of food waste and fish sludge for valuable multiproduct generation

C02 / *A. Hofmann, S. Löhn, I. Atamaniuk, K. Kuchta (DE)*
Utilizing bioactive molecules from microalgae microbiomes for sustainable health management in aquaculture

C03 / *L. Moreschi, M. Gallo, A. Del Borghi, G. Perotto, E. Gagliano (IT)*
Valorisation of biowaste in the production of plastic trays in a circular economy perspective: environmental assessment through a life cycle approach

C04 / *K.G. Sakellariou, M. Mendiola, I. Barasoain-Echepare, A. Lopez Contreras, E. Maron, N. Ntavos, S. Ros, M. Uyttebroek, M.M. Obermeier, X. Franco, T. Fernández-Arévalo (GR)*
MODEL2BIO. Modelling tool for giving value to agri-food residual streams in bio-based industries

C05 / *M. Kemal Ak, A. Steffens, C. Lara, V. Preyl, J. Huang, C. Maurer (DE)*
Fiber recovery from municipal biowaste for the production of compostable plant pots: a step towards sustainable bioeconomy

D. BIOLOGICAL TREATMENT

D01 / *K. Chamrádová, P. Basinas, J. Rusín (CZ)*
Application of kinetic models for the evaluation of methane generation produced from the anaerobic digestion of pretreated corn silage with various White Rot Fungi and at different conditions

D02 / *R. Ballestar de las Heras, S. Fernandez Ayala, F. Carrillo, F.J. Cañavate, X. Colom (ES)*
Storage degradation process of a biodegradable multilayer films

D03 / *J. Kim, S. Kim, X. Zhao, J. Lee, J.Y. Kim (KR)*
Effects of thermal hydrolysis temperature on lignocellulose structure and hydrogen production of food waste

D04 / *M. Kemal Ak, A. Steffens, C. Lara, V. Preyl, J. Huang, C. Maurer (DE)*
Transforming biowaste to valuable products: the hydrocyclone process and waste characterization in a sustainable biorefinery system

D05 / *X. Zhao, J.Y. Kim (KR)*
Impacts of CR-39 resin micro-plastics on the anaerobic digestion of seaweed in CSTR reactors

D06 / *D. Hernández, C. Zambra C., J. Diaz (CL)*
Evolution of physical-chemical parameters, microbial diversity, and VOCs emissions of tomato pomace exposed to ambient conditions in open reservoirs

E. THERMAL TREATMENT

E01 / *S.-J. Lee, K. Kwon, Y. Jeon (KR)*
Design of an optimal municipal waste treatment facilities for a sustainable waste-to-energy management

E02 / *A. Messineo, A. Picone, C. Corrado, D. Ticali, M. Volpe (IT)*
Hydrothermal carbonization of waste biomass as a sustainable technology for the recovery of energy and valuable carbonaceous materials

E03 / *P. Basinas, K. Chamrádová, O. Vosnaki, J. Rusín (CZ)*
Improvement of biogas production from the anaerobic digestion of waste biomass using raw and modified with nitric acid biochar derived from the pyrolysis of biomass and digestate

E04 / *L. Acampora, S. Grilletta, G. Costa (IT)*
Application of Carbon Capture Utilization and Storage (CCUS) to waste to energy plants: a review

E05 / *D. Lee, B. Sang, T. Ohm (KR)*
Numerical study on the design of solid refuse fuel for power plant and its combustion characteristics

E06 / *L. Yin, F. Han, M. Wang, D. Chen, Y. Hu (CN)*
Heat transfer characteristics of large-scale biomass particles during pyrolysis process

F. LANDFILLING

F01 / *R. de Almeida, M.C. Lavagnolo, J.C. Campos (BR)*
A cradle-to-gate life cycle analysis of membrane concentrate management from landfill leachate treatment plants

F02 / *S. Hoshino, T. Umeki, A. Tanaka, Y. Matsufuji (JP)*
Improvement progress by Fukuoka Method at Thien Binh dump site in Yangon City, Myanmar

F03 / *L. Morávková, H. Šnajdaufová, Z. Petrusová, F. Kaštánek, O. Šolcová (CZ)*
Keeping good separation properties of spiral wound membrane module for carbon dioxide separation from raw biogas

F04 / *F. van Raffe, N. Quist, T. Canen, R.N.J. Comans (NL)*
Sustainable landfill management in the Netherlands: long term changes in landfill leachate quality during (an)aerobic in-situ stabilization

F05 / *R. Michael (AU)*
The observer effect and the limitations of lysimeters for evaluating landfill phytocap performance

F06 / *L.S. dos Muchangos (JP)*
Estimating the emissions from implementing a semi-aerobic landfill in a massive open dump site in Mozambique

POSTER SESSIONS
SESSIONI POSTER

F07 / *E. Trottini, G. Barina, T. Denoun, A. Baldini, M. Venturini (FR)*
The Waga 4 World project: the biggest landfill green gas project in Europe financed by a Biomethane Purchase Agreement and the European Union

G. INDUSTRIAL WASTE AND CONTAMINATED SITES

G01 / *N. Fraeyman, S. Malfait, V. Duprez, H. De Coninck, E. De Meester, E. Mortier (BE)*
Pathogens in solid medical waste and risk assessment for human disease

G02 / *F. Kaštánek, M. Dlasková, J. Bureš, O. Šolcová (CZ)*
Removal of heavy metals and arsenic from contaminated industrial soils by leaching with animal hydrolysates under the synergistic effect of chelation and biostimulation

G03 / *A. Estoková, R. Figmig (SK)*
Study on hydration of cement composite with various industrial waste

G04 / *F. Xu (CN)*
CO_2 and oxidants method for in situ regeneration of permeable reactive barriers for leachate–contaminated groundwater

G05 / *I. Bianco, D. Panepinto, M. Zanetti (IT)*
Life Cycle Assessment of plastic wastes from the automotive sector

H. WASTEWATER TREATMENT

H01 / *M. Spáčilová, P. Dytrych, M. Lexa, L. Wimmerová, P. Mašín, R. Kvaček, O. Šolcová (CZ)*
A newly developed technology for microplastics removal from wastewater

H02 / *Y. Yang, S. Kalam, J. Lee, Y. Zhang (CN)*
Synchronous of salt and water resources recovery in high salinity wastewater by membrane distillation

H03 / *M. Balintova, N. Junakova, Y. Chernysh, P. Pavlikova (SK)*
Removal of sulphates from acidic solutions using ion exchange

H04 / *G. Farabegoli, A. Rebelo (IT)*
EU IMPEL project Wastewater in Natural Environment (WiNE)

H05 / *M. Dlasková, M. Spáčilová, F. Kaštánek, O. Šolcová (CZ)*
Utilization of biomass and plant waste to remove pollutants from water and soil

EXHIBITORS, ORGANISERS, MEDIA PARTNERS AND MORE

ESPOSITORI, ORGANIZZATORI, MEDIA PARTNER E ALTRE INFORMAZIONI

EXHIBITORS
ESPOSITORI

Our companies' exhibition will be held in the Foyer of the Congress Centre and will be accessible to Symposium delegates at all times from Monday to Friday. Please find below a list of exhibitors.

L'esposizione commerciale sarà allestita nel foyer del Centro Congressi e sarà accessibile in qualsiasi momento dal lunedì al venerdì.
Si elencano di seguito gli espositori presenti.

BABCOCK & WILCOX

The Babcock & Wilcox company was born in 1867 when Stephen Wilcox and George Babcock designed the first inherently safe water-tube boiler. Since then, the company has grown across industries and continents and is now one of the world's leading supplier of environmental and energy conversion technology.
As a technology innovator, Babcock & Wilcox (B&W) provides a comprehensive package of engineered solutions for a wide range of applications. B&W consists of three branches:

- Renewable: Technologies for efficient and environmentally sustainable power and heat generation, including waste-to-energy, biomass energy, solar, energy storage and chemical recovery systems for the pulp and paper industry. Our leading technologies support a circular economy, diverting waste from landfills to use for power generation and replacing fossil fuels, while recovering metals and reducing emissions.
- Thermal: A full suite of best-in-class decarbonization, emissions control and environmental technology solutions for utility and industrial steam generation applications around the world. Our broad experience includes systems for hydrogen production and carbon capture, cooling, ash handling, particulate control, nitrogen oxides and sulfur oxides removal, mercury control, and flue gas condensation.
- Environmental: Steam generation equipment, aftermarket parts, construction, maintenance and field services for plants in the power generation, oil and gas, and industrial sectors. Our extensive global base of installed equipment serves utilities and general industrial applications including refining, petrochemical, food processing, metals and other commercial installations.

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EXHIBITORS
ESPOSITORI

BPC INSTRUMENTS AB

BPC Instruments AB (former Bioprocess Control AB) is a Swedish-based technology company that develops and sells automated, analytical instruments that allow for more efficient, reliable, and higher quality research and analysis in a wide range of industries (e.g., biogas production, biodegradability of bioplastics and other polymers, wastewater treatment, animal nutrition, bioethanol production, biohydrogen production, etc). The result is significant reductions in time and labour and more efficient use of manpower resources.
Product portfolio:

- Gas Endeavour (GE)
- Automatic Methane Potential Test System (AMPTS II)
- BioReactor Simulator (BRS)
- BPC Go

BPC Instruments AB has over a thousand customers from nearly 500 organizations in 70 countries, covering both academic research institutes and industrial players in biogas sector. Currently, there are about 800 scientific publications based on data generated by our smart instruments and more are added each month.
A selection of scientific articles, in which our smart analytical instrument was used, are listed at our website: bioprocesscontrol.com/scientificreferences.

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CISA PUBLISHER

Cisa Publisher is an imprint of Eurowaste Srl. Cisa Publisher represents the Eurowaste section dealing with transfer to the media (books, reports, textbooks, CD, etc) of the wealth of information accumulated throughout activities performed by the University of Padova (in particular in the field of waste management and contaminated site remediation) and by IWWG and member scientists.

CATALOGUE:

Detritus - Multidisciplinary Journal for Waste Resources and Residues

Latest Book:
R. Cossu, V. Grossule M.C. Lavagnolo (2020)
La discarica sostenibile: Ruolo nell'Economia Circolare e proposte normative

IWWG Monograph series:

- Sustainable Landfilling
- Management and Landfilling of Solid Wastes in Developing Countries
- Landfill Aeration

Other Monographs:

- Urban Mining: A global cycle approach to resource recovery from solid waste

Conference Proceedings:

- Venice International Symposium on Energy from Biomass and Waste
- Sardinia International Waste Management and Landfill Symposium
- SUM - Symposium on Urban mining and Circular Economy

Publications are available at the registration desk and may be ordered online from the website www.cisapublisher.com.

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HiiCCE

The Hamburg Institute for Innovation, Climate Protection and Circular Economy - HiiCCE is a subsidiary company of the city of Hamburg Cleansing Department (SRH) and an affiliated research institute of Hamburg University of Technology. As such, HiiCCE acts as a think tank for the circular economy. The institute comprises the competences of the city of SRH, the Circular Resource Engineering and Management Institute (CREM) of the Hamburg University of Technology (TUHH), and the former JOMA Environmental Consultancy. Unique about HIC is the combination of scientific practice, consultancy experience and operative powers.
HiiCCE, established in August 2021, has multiple experience in implementing Horizon 2020, Interreg as well as national research and cooperation projects. Moreover, HiiCCE is involved in application and implementation of projects related to the following topics:

- Hydrogen technology
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- National and international cooperation
- Innovation Management

Particularly, they offer their clients:

- Transformation concepts
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- Waste management concepts
- Market research and analysis
- Project management and consultancy

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EXHIBITORS
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MARCOPOLO ENVIRONMENTAL GROUP

Marcopolo Environmental Group is an international reality with over 40 years of history behind it, operating in the environmental field, with a large number of patents and production processes, for the "sustainable and active" industrial valorisation of waste / good by-products and the production of energy and biomethane from renewable sources.
Marcopolo Environmental Group's environmental activities are manifold and include the production of green energy from landfill biogas, biogas from selected agro-industry by-products, wind power and agrophotovoltaics.
The group is also active in the production of biomethane, landfill safety, environmental remediation and the production of humus for the regeneration of agricultural land.

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OXOCO SRL

Oxoco is an innovative Italian startup, licensee of the Flameless Pressurized Oxy-combustion (FPO) technology, developed by Itea Spa and licensed worldwide exclusively to Oxoco for application to municipal and special wastes. The FPO technology, included in the BAT reference document for waste incineration, represents a turning point towards the SDGs of waste management processes.
Flameless Oxycombustion is a combustion process operated under pressure at high temperature in oxygen atmosphere. By this technology, Oxoco offers an optimal solution for waste treatment, due to its low costs, the energy recovery and CO_2 capture. In addition, this process transforms waste into vitrified slags tha can be reused, with a substantial environment benefit in terms of reduced pollutant emissions and consequent climate-changing matters. The coventional technologies for waste treatment generate, instead ,significant quantities of waste fractions. The Oxycombustion Flameless technology can handle the streams coming out from the waste treatment cycle , pursuing the definitive end of the cycle with no other waste generating, but only immediately reusable material: glassy material and CO_2. The technology realizes the efficient treatment of a wide range of waste of urban and industrial origin, whether non-hazardous or hazardous, even if highly contaminated.
Oxoco offers a Plant that realises the principle of the Circular Economy, acting as an alternative to landfill and using the best waste treatment technology. "Isotherm PWR®" technology has been defined as emerging "BAT" (Best Available Tecnique) by the European Community. It is able to implement the recovery of matter and energy from waste, ensuring minimal environmental impact. It does not release greenhouse gases and pollutant gases by transforming PAHs, Dioxins, Furans and PCBs into carbon dioxide and water, both of which are recovered and intended for industrial reuse.

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ORGANISERS
ORGANIZZATORI

EUROWASTE Srl

Eurowaste Srl was founded to manage communication and educational tools in connection with research activities performed in the field of environmental engineering by the University of Padova. Over the years, it has become a service agency that works in national and international context in the scientific events organization.
Its activities ARE addressed to the entire Scientific Community in order to support it in conceiving and organising congress, symposia, meetings, workshops and all kind of events.
For the past 25 years Eurowaste has been organising International Symposia registering the participation of up to 1000 delegates from dozens of different countries worldwide.
Since 2005 Eurowaste has set up a collaboration with IWWG-International Waste Working Group, established in 2002, following a world-wide demand, to serve as a forum for the scientific and professional community.

Eurowaste Srl nasce per gestire gli strumenti di comunicazione e divulgazione scientifica connessi alle attività di ricerca svolte dell'Università di Padova nel campo dell'ingegneria ambientale. Nel tempo è diventata un'agenzia di servizi che opera a livello nazionale ed internazionale nel settore dell'organizzazione di eventi di carattere scientifico.
Da oltre 25 anni Eurowaste organizza simposi internazionali che in alcune edizioni hanno visto la partecipazione di oltre 1000 delegati provenienti da tutto il mondo.
La sua attività si rivolge a tutta la Comunità Scientifica supportandola nell'ideazione, progettazione e realizzazione di congressi, simposi, meeting, workshop ed eventi di ogni genere.
Dal 2005 Eurowaste collabora stabilmente con l'IWWG, un'associazione senza fini di lucro nata nel 2002 con l'obiettivo di costituire un forum internazionale di discussione scientifica sulle tematiche connesse alla gestione dei rifiuti solidi.

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IWWG - INTERNATIONAL WASTE WORKING GROUP

The International Waste Working Group, founded in 2002 and registered as a no-profit organisation, serves as a forum for the scientific and professional community. The IWWG aims to provide an intellectual platform to encourage and support integrated and sustainable waste management and to promote practical scientific development in the field.
The group was conceived to provide a "home" for professionals and researchers, and give us a voice to be able to beneficially influence waste management and research.

The benefits of IWWG membership are the following:

- Subscription to IWWG official Journal Waste Management at a special discount price, both print subscription or print+electronic subscription. (electronic subscription includes access to back numbers from 1995).
- Access to the members area on the website
- Access to previous editions of IWWG conferences proceedings (Index)
- Access to the IWWG members discussion forum on the website
- Free download of LeachXS - Lite from the members area on the website
- Discount on IWWG Training Course Registration
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- Discount on the entrance fee of IWWG international waste management symposia (official IWWG conferences)
- Discount on IWWG publications (e.g. textbooks)
- Discount on Elsevier publications
- Participation in all activities of IWWG including task groups

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DETRITUS / MULTIDISCIPLINARY JOURNAL FOR CIRCULAR ECONOMY AND SUSTAINABLE MANAGEMENT OF RESIDUES

Detritus is an official journal of IWWG, International Waste Working Group, published by Cisa Publisher.
The journal is aimed at extending the "waste" concept by opening up the field to other waste-related disciplines (e.g. earth science, applied microbiology, environmental science, architecture, art, law, etc.) welcoming strategic, review and opinion papers.
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La partecipazione alla sessione italiana del Simposio Sardinia 2023 dà diritto a tutti gli ingegneri iscritti all'Albo all'acquisizione di un totale di **8 CFP** - crediti formativi professionali, certificati dall'Ordine degli Ingegneri di Cagliari - Scuola di Formazione.
All'entrata di ciascuna sessione saranno disponibili i moduli per la raccolta delle firme in entrata ed uscita. Gli interessati sono pregati di contattare la segreteria organizzativa per richiedere l'attestato di frequenza e per comunicare il proprio codice fiscale, ordine di appartenenza, sezione e numero di iscrizione all'Albo.
Ai sensi del Regolamento per la Formazione Continua, agli ingegneri che parteciperanno al convegno saranno riconosciuti:

Sessione	data	ore	CFP
F01 - Strategie e prassi nella gestione dei rifiuti	09/10 ore 15.00	2	**2**
F02 - Rifiuti organici e trattamenti biologici	09/10 ore 17.00	2	**2**
F03 - Recupero di materiali ed energia dai rifiuti	10/10 ore 9.00	2	**2**
F04 - Discariche e sink sostenibili per i rifiuti residui	10/10 ore 11.00	2	**2**
Totale			**8**

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