SARDINIA 2021

DAILY PROGRAMME

UPDATED ON 14/09/2021

SESSION A01 / / 11th October 2021 15:00-16:30
MINIMISATION AND RECYCLING
Chair / *Presidente*: To be defined

R. Stegmann (DE)
New concepts for waste minimisation

M. Wiprächtiger, M. Rapp, M. Haupt, S. Hellweg (CH)
Environmental assessment of waste prevention

J. Lederer, A. Aldrian, A. Bartl, J. Fellner, D. Blasenbauer, L. Gritsch, W. Ipsmiller, P. Kählig, J. Mühl, S. Skutan (AT)
Towards a recycling-based circular economy: a conceptual approach

C. Roithner, O. Cencic, H. Rechberger (AT)
Multiple application of statistical entropy: assessment of recycling process effectiveness as well as product-inherent recyclability

M. van Praagh, L. Brander (SE)
Obstacles and promoters for increased use of recycled materials - who takes the risk?

SESSION A02 / / 11th October 2021 17:00-18:30
STRATEGIC ISSUES IN CIRCULAR ECONOMY
Chair / *Presidente*: To be defined

P.J. Shaw, I.D. Williams (UK)
Destined for resource efficiency? A critical perspective of municipal waste destinations across the European Union, 1995 to 2019

M. Rossetti, N. Lamanna, L. Zoia, A. Franzetti (IT)
From a smoke-free policy to an end of waste proposal at the University of Milano-Bicocca

R. Maletz, J. Sachse (DE)
Evaluation of Waste-to-Energy technology in Germany

B. Staley, S. Boxman, P. Hargreave (US)
State of practice of organic waste management & collection in Canada

SESSION A03 / / 12th October 2021 09:00-10:30
RESIDUES FROM THERMAL TREATMENT
Chair / *Presidente*: To be defined

M. Šyc, J. Hykš, T. Baloch, J. Valentin, E. Korotenko, B. Zach (CZ)
Perspectives of bottom ash utilization in the Czech Republic

K. Kremser, H. Schoen, S. Thallner, S. Spieß, M. Haberbauer, J. Kucera, G.M. Guebitz (AT)
Recovery of valuable metals from waste incineration residues by iron- and sulfuroxidizing bacteria

E. Korotenko, M. Šyc, L. Grič, T. Baloch , P. Drápela (CZ)
Resource recovery potential of calcium-based APCr from MSWI

H. Muñiz Sierra, M. Šyc, B. Zach, E. Korotenko, A. Shtukaturova (CZ)
The influence of working parameters for the up-concentration of metal aluminum from the fine fraction of incineration bottom ash by wet shaker table

S. Ge, D. Chen (CN)
MSW pyrolysis volatile reforming over char catalyst under high-temperature CO2 atmosphere

SESSION A04 / / 12th October 2021 11:00-12:30
ENVIRONMENTAL ISSUES IN THERMAL TREATMENT
Chair / *Presidente*: To be defined

D. Panepinto, M.C. Zanetti (IT)
An overview of msw thermal treatment and the analysis of the Turin incineration plant

J. Fellner, T. Schwarzböck (AT)
Performance impairment of Waste to Energy plants due to insufficient mixing of the waste feed

H. Zhou, L. Hong, D. Chen (CN)
Influence of none-SCR De-NOx technology on dioxin emissions in a full scale MSW incinerator

H. de Chefdebien, C. Priault, C. Coste, P. Darde, S. Durecu (FR)
Mercury behaviour, monitoring and treatment in Energy Recovery Facilities - SVDU's study, ESSEVA

A. Serras-Malillos, A. Peña, E. Acha, A, Lopez-Urionabarrenechea, P, Serras, B,B. Perez-Martinez, B.M. Caballero (ES)
Chemicals reclamation from waste composites: experimental validation of a CFD model

SESSION A05 / / 12th October 2021 15:00-16:30
FOOD WASTE CHARACTERISATION
Chair / *Presidente*: To be defined

K. Watanabe, T. Okayama, H. Yamakawa (JP)
Household characteristics and food waste generation - Waste sorting analysis and questionnaire survey

A. Happenhofer, P. Beigl, C. Zafiu, E. Binner, R. Ottner (AT)
Analysing biogenic waste composition - a novel standard for food waste, polymer and impurity assessment in Austria

E. Nie, P. He, H. Zhang, L. Shao, F. Lü (CN)
Fate of municipal biowaste during transportation: variation of physio-chemical characteristics and consequences on biomethane potential

W. Peng, H. Zhang, F. Lü, P. He (CN)
Conversion of food waste and its digestate to nitrogen self-doped char and methane-rich syngas via autogenic pressure carbonization

SESSION A06 / / 12th October 2021 17:00-18:30
FOOD WASTE MANAGEMENT
Chair / *Presidente*: To be defined

T. Okayama, K. Watanabe, H. Yamakawa (JP)
Why do householders throw away edible food? - Results of a questionnaire survey in Tokyo

C. Giordano, L. Falasconi, F. Alboni, N. G. di Fiore, E. Carloni (IT)
Monitoring household food waste in Italy: a diary study over 500 families

B. Bello (MX)
Environmental concern and food waste management: a case study on food waste in restaurants from Nuevo Leon, Mexico

C. Li, L. Hao, F. Lü, L. Shao, P. He, H. Zhang (CN)
Microbial community composition and key drivers in full-scale food waste anaerobic digesters

SESSION A07 / / 13th October 2021 09:00-10:30
TOOLS FOR SUSTAINABLE LANDFILLING
Chair / *Presidente*: To be defined

M.C. Lavagnolo, V. Grossule, Q. Luo, R. Savio (IT)
Washing of residual waste in the framework of the sustainable landfill

M. Ritzkowski (DE)
Landfill aeration - An important contribution towards landfill sustainability

H. Lammen, C.R. Cruz Osorio, H. Scharff, R.N.J. Comans (NL)
Sustainable landfill management: leachate development in two aerated landfills

C.R. Cruz Osorio, H. Lammen, H. Oonk (NL)
Sustainable landfill management: carbon removal in two aerated landfills

F. van Raffe, R. Jin, H. Lammen, J.J. Dijkstra, R.N.J. Comans (NL)
Sustainable landfill management in the Netherlands: application of geochemical modelling to characterise solid waste prior to (an)aerobic stabilization

SESSION A08 / / 13th October 2021 11:00-12:30
EFFECTS OF AERATION ON LANDFILL EMISSIONS
Chair / *Presidente*: To be defined

M. Nag, T. Shimaoka, T. Komiya (JP)
Effect of aeration mode and leachate recirculation scheme on MSW stabilization and nitrous oxide production in aerobic and aerobic-anaerobic landfill method

N. Meza, H. Lammen, C. Cruz, T.J. Heimovaara, J. Gebert (NL)
Spatial variability of gas composition in landfill under in situ aeration

J. Gebert, T. de Jong, T. Rees-White, R. Beaven, H. Lammen (NL)
Spatial variability of leachate tables, leachate composition and hydraulic conductivity in a landfill stabilized by in situ aeration

N. Fricko, C. Brandstätter, J. Fellner (AT)
Carbon and nitrogen metabolism in aerobic, anaerobic-aerobic and anaerobic landfills

SESSION A09 / / 13th October 2021 15:00-16:30
BIOENERGY FROM WASTE AND BIOMASS
Chair / *Presidente*: To be defined

E. Rossi, I. Pecorini, R. Iannelli (IT)
Multilinear regression model for biogas production prediction from dry anaerobic digestion of OFMSW

A. Randazzo, A. Folino, F. Tatàno, F. Tassi, S. de Rosa, A. Gambioli (IT)
Volatile organic compounds (VOCs) from green waste anaerobic digestion: degradation proceeding and sources assessment

M. Muradin, J. Kulczycka, G. de Clercq, R. Verhe (PL)
Enzymatic conversion of organic municipal solid waste into biofuels: environmental impact of BioRen project

A. Folino, A. Randazzo, F. Tassi, F. Tatàno, S. de Rosa, A. Gambioli (IT)
Lab-scale evaluation of bioenergy from green waste through anaerobic digestion: substrate, biogas, and digestate characterisation

SESSION A10 / / 13th October 2021 17:00-18:30
STRATEGIES FOR PLASTICS RECYCLING
Chair / *Presidente*: To be defined

M. Lisiecki, A. Damgaard, T. F. Astrup (DK)
Plastic circularity: Systematic evaluation of circular economy initiatives

M. Klotz, M. Haupt, S. Hellweg (CH)
Are we designing plastic recycling systems that allow for primary material substitution?

A. Damgaard, M.K. Eriksen, C. Lodato, A.E. Daugaard, T.F. Astrup (DK)
Chemical versus mechanical recycling of plastics – What is a fair comparison?

F. Ardolino, U. Arena (IT)
Alternative treatments for challenging waste plastics: environmental performances in a life cycle perspective

B. Silva, M.C. Paiva, L.M.C. Pinto (PT)
Circularity of plastics - Life cycle assessment of plastic PET bottles in Portugal

SESSION A11 / / 14th October 2021 09:00-10:30
OCCURRENCE OF MICRO- AND MACRO-PLASTICS IN THE ENVIRONMENT
Chair / *Presidente*: To be defined

J. Mayerhofer, G. Obersteiner, S. Lenz (AT)
Macro-plastic sources, types and flows in the Danube river

A. Marrone, M.F. La Russa, L. Randazzo, D. La Russa, E. Cellini, D. Pellegrino (IT)
Microplastics distribution in the center of Mediterranean and evaluation of local "hot spots"

S. Lenz, J. Mayerhofer G. Obersteiner (AT)
Evaluation and assessment of different microplastic measurement methods in Danube river basin

C. Trois, T. Mani (ZA)
Capturing plastic waste "streams" to increase climate change resiliency in the South African Umgeni River catchment

T. Schwarzboeck, S. Spacek, H. Rechberger (AT)
Monitoring the mass of microplastics using a simple thermoanalytical method

SESSION A12 / / 14th October 2021 11:00-12:30
POST-USE BEHAVIOUR OF PLASTICS
Chair / *Presidente*: To be defined

S. Serranti, L. Fiore, G. Bonifazi, R. Horimoto, H. Takeuchi, S. Kashiwada (IT)
Characterization of plastic litter along sandy beaches by hyperspectral imaging coupled with chemometrics

A. Białowiec, P. Żak (PL)
Biodegradability of bioplastics under anaerobic conditions: biogas production kinetics

M. Falzarano, A. Polettini, R. Pomi, A. Rossi (IT)
Anaerobic digestion of biodegradable plastics: analysis in terms of process conditions and overall performance

T. Vasconcelos, B. Silva, C.A. Bernardo (PT)
Comparing the environmental performance of plastic (PET) and glass water bottles using the Life Cycle Assessment methodology

SESSION A13 / / 14th October 2021 15:00-16:30
CARBON CAPTURE IN THERMAL TREATMENT PLANTS
Chair / *Presidente*: To be defined

V. Bisinella, T. Hulgaard, C. Riber, A. Damgaard , T.H. Christensen (DK)
Introducing carbon capture and storage (CCS) in waste incineration

B. Zach, M. Šyc, P. Izák (CZ)
Limitations of membrane separation of CO2 at a waste-to-energy plant based on experimental investigation

T.H. Christensen, V. Bisinella (DK)
Scenarios for introduction of carbon capture and utilization (CCU) in waste incineration

I. Fonts, M. Abián, N. Gil-Lalaguna, J. Ábrego, J.-L. Sánchez, H.-H. Carstensen (ES)
Investigation of the CO2 adsorption capacity of chars produced by pyrolysis of macro-components of digested manure and their blends

SESSION A14 / / 14th October 2021 17:00-18:30
CLIMATE CHANGE AND WASTE MANAGEMENT
Chair / *Presidente*: To be defined

S. Scherhaufer, G. Obersteiner (AT)
Food waste and its impacts on climate change

A.M. Fredenslund, E. Gudmundsson, J.M. Falk, C. Scheutz (DK)
Danish national effort to minimise methane emission from biogas plants – Lessons learned

M. van Praagh (SE)
Municipal Solid Wastes' untapped energy and GHG saving potential – A closer look at the Scania region, Sweden

C. Wünsch, A. Tsybina (DE)
Climate change mitigation potential of the Russian municipal solid waste sector

L. Landen, A. Grochowska (SE)
Biochar from garden waste – A local carbon negative circular loop

SESSION A15 / / 15th October 2021 09:00-10:30
EDUCATION AND PUBLIC PERCEPTION IN WM
Chair / *Presidente*: To be defined

G. Calderari, K.Cipri, C. Cucuzzella (IT)
How GREENUS Project responds to the Education needs in Waste Management in Asia

G. De Feo (IT)
Waste management education with the Greenopoli project: from schools to television

O. Janikowska, J. Kulczycka, G. De Clercq (PL)
Deliberative democracy as the education tool for sustainable municipal waste management

E.M. Mukhtar, I.D. Williams, P.J. Shaw (GB)
Out of sight, out of mind: fundamental factors in waste management systems and their visibility

C. Maiorana, E. Elamè, M.C. Lavagnolo (IT)
Waste Management education projects in Cameroon: results and challenges in 10 years

SESSION A16 / / 15th October 2021 11:00-12:30
POLICIES IN WASTE MANAGEMENT
Chair / *Presidente*: To be defined

C. Cord'Homme (FR)
Benchmarking in European countries of waste disposal tax and its efficient impact on waste management

L. Lombardi (IT)
Environmental comparison of residual municipal solid waste treatments

I. Filosa, L. Lombardi, C. Lubello, A. Fazio, A. Oliveri, D. Scamardella (IT)
Environmental assessment of the new MSW collection plan implementation in the city of Florence

A. Singhal, S. Goel , B.K. Dubey (FI)
Application of Google Earth in solid waste management: for developing waste management plan and studying waste dumpsites

SESSION B01 / / 11th October 2021 15:00-16:30
HYDROTHERMAL TREATMENT OF ORGANIC WASTE
Chair / *Presidente*: To be defined

L. Lombardi, F. Tuci, S. Fabrizi, B. Mendecka, M. Ślizc, M. Wilk (IT)
Hydrothermal carbonization of the organic fraction mechanically separated from the residual MSW

P. Evangelopoulos, R. Sott, L. Smuk (SE)
Experimental investigation of hydrothermal liquefaction (HTL) as thermal treatment method for plastic packaging mixtures to achieve materials circularity

J.K. Yankyera, N.S.A. Derkyi, S.K. Pelz, S. Paczkowski, K. Sarquah (GH)
Techno-economic assessment of combined heat and power generation from hydrothermally carbonized biomass for an agro-process industry

G. Cappai, A. Carucci, G. De Gioannis, G. Farru, S. Milia, A. Muntoni, G. Selenu (IT)
Hydrothermal carbonization of agro-industrial waste

SESSION B02 / / 11th October 2021 17:00-18:30
PYROLYSIS OF SPECIFIC WASTE
Chair / *Presidente*: To be defined

G. Faussone (IT)
Solid residues from the pyrolysis of marine litter: closing the mass balance of chemical recycling

J. Ruiz, I. Fonts, M. Sancho, I. Perez, J. Ceamanos, J. Abrego, G. Gea (ES)
Pyrolysis of two different kinds of proteins: collagen and soybean protein. Analysis of their contribution on the pyrolysis of rich protein animal wastes

J. Fernández-Ferreras, N. Sánchez-Fernández, T. Llano, A. Coz (ES)
Slow pyrolysis of coffee silverskin and spent coffee for its integral valorisation

J. Fernández-Ferreras, C. Rueda (ES)
Sewage sludge pyrolysis conditions assessment to maximize the liquid fraction for its valorisation

SESSION B03 / / 12th October 2021 09:00-10:30
WASTE COLLECTION & CHARACTERISATION FOR RECYCLING
Chair / *Presidente*: To be defined

A. Degli Esposti, C. Magrini, A. Bonoli , S. Cavani (IT)
Door-to-door paper waste collection: a case study of cost and ergonomics optimisation

T. Althoff, R. Holzhauer, S. Schmuck (DE)
Using CO2 balancing for evaluating the efficiency of systems for citizen-oriented waste collection compared to classical waste collecting systems

A. Verstegen, M.J. Bouzrouti, A. Hensen, G. Moreau, J. Jansen, L. Weemaels, J. Van Caneghem (BE)
Quantification of the packaging share in household hazardous waste by direct sampling: case study and methodology

A. Verstegen, E. De Bruyn, F. Soers , R. Van Renne, B. Vanaenroyde, J. Van Caneghem (BE)
Characterization of street bin waste with a focus on packaging: case study in a regional city in Belgium

Y. Wang, K. L. Thyberg, E. Hewitt, D. J. Tonjes (US)
New York City residential wastes: changes in composition and management, 1990-2017

SESSION B04 / / 12th October 2021 11:00-12:30
WASTE BIOREFINERY
Chair / *Presidente*: Aldo Muntoni (IT), Luca Alibardi (UK)

A. Oumarou Amadou, M. Cera, G. P. De Gaudenzi, G. De Gioannis, G. Marcheselli, A. Muntoni, A. Serpe, S. Trudu (IT)
Bio-derived acids for Co-recovery from hard metal waste by solvometallurgy

G. De Gioannis, A. Muntoni, A. Serpe, S. Trudu (IT)
The wide applicative spectrum of biorefinery products: metals recovery from WEEE

R. Malesani, A. Schievano, A. Pivato (IT)
Thermal energy recovery from biowaste and organic residues implementing thermocompost technology in decentralised areas

F. Asunis, G. De Gioannis, G. Francini, L. Lombardi, A. Muntoni, A. Polettini, R. Pomi, A. Rossi, D. Spiga (IT)
Evaluation of the environmental sustainability of biorefinery applied to cheese whey

T.F. Astrup, P.F. Albizzati, S.A. Bassi, C. Lodato (DK)
Are waste biorefineries sustainable? Lessons learned and recommendations provided

SESSION B05 / / 12th October 2021 15:00-16:30
STRATEGIES & CASES IN WEEE MANAGEMENT
Chair / *Presidente*: To be defined

T. Nigl, R. Pomberger (AT)
Fire-hazardous waste materials – Risk analysis and assessment of portable and lithium-ion batteries in waste management systems

M. Osmani, J. Pollard, J. Forde, C. Cole, S. Grubnic, J. Horne, P. Leroy (GB)
Circular economy business model opportunities, challenges, and enablers in the electrical and electronic equipment sector: stakeholders' perspectives

M. Pamperl, G. Obersteiner, E. Schmied (AT)
Hibernation of disused electrical and electronic equipment in Austrian households – Analysis of motives for storage and potential for reuse

SESSION B06 / / 12th October 2021 17:00-18:30
CIRCULARITY IN WASTE ARCHITECTURE
Chair / *Presidente*: To be defined

L. Pellegrini, L.C. Tagliabue, E. Seghezzi, G.M. Di Giuda (IT)
Digital and green public procurement for construction and demolition waste management

E. Labrozzi, S. Puleio (IT)
Re-tile: an innovative infrastructure for the circular management of façade cladding materials

A. Gassner, J. Lederer, J. Fellner (AT)
The impact of urban traffic planning and thus implied modal choice and motorization rate on future resource consumption and construction and demolition waste generation

SESSION B07 / / 13th October 2021 09:00-10:30
MANAGEMENT OF CONSTRUCTION & DEMOLITION WASTE
Chair / *Presidente*: To be defined

J. Lederer, A. Gassner, F. Kleemann, J. Fellner (AT)
Circular economy of mineral construction materials and demolition waste: a case study from Vienna

A. Yu, I. Wong, K. Mok (HK)
Strategies for minimizing and managing refurbishment and renovation waste

G. Bonifazi, G. Capobianco, S. Serranti, S. Malinconico, F. Paglietti (IT)
Asbestos detection in construction and demolition waste adopting different classification approaches based on short wave infrared hyperspectral imaging

M. Castro-Díaz, M. Osmani, S. Cavalaro, P. Needham, J. Thompson, S. Elliott, B. Parker, T. Lovato, D. Jalland (GB)
A methodologic approach based on hydrocyclone separation and acid leaching to purify gypsum from refurbishment plasterboard waste

N. Han Hoang, T. Ishigaki, T. Watari M. Yamada, K. Kawamoto (JP)
Building demolition in Vietnam: current state and possibility for selective dismantling

SESSION B08 / / 13th October 2021 11:00-12:30
RECYCLING OF WASTE IN BUILDING MATERIALS
Chair / *Presidente*: To be defined

S.A. Viczek, A. Aldrian , R. Pomberger, R. Sarc (AT)
Recycling of waste materials in the cement industry and implications for its role in a circular economy

A. Eštokova, R. Figmig, N. Galanova (SK)
Waste incorporation in building materials to improve their performance under acid rain attack

N. Stevulova, J. Junak, J. Strigac, E. Terpakova (SK)
Mechanical properties of hydraulic road binder using ground granulated blast furnace slag and additional component of cement bypass dust

D. Blasenbauer, J. Fellner, S. Skutan, J. Lederer (AT)
Wet treatment of construction and demolition waste in industrial scale – Analysis of an innovative recovery facility

SESSION B09 / / 13th October 2021 15:00-16:30
CHARACTERISATION OF PLASTICS
Chair / *Presidente*: To be defined

H. Wiesinger, M. Klotz, Z. Wang, S.Hellweg (CH)
A comprehensive overview of plastic monomers, additives and processing aids

G. Bonifazi, G. Capobianco, P. Cucuzza, S. Serranti, A. Uzzo (IT)
Recycling-oriented characterization of PET waste stream by SWIR hyperspectral imaging and variable selection methods

S. Harrad, D. Drage, M. Abdallah, M. Sharkey , H. Berresheim (GB)
XRF screening of plastic waste for compliance with low POP concentration limits in Ireland

M. Sharkey, D. Drage, S. Harrad, M. Coggins, H. Berresheim (IE)
Further development of XRF screening methodologies for the quantification of bromine- and phosphorous-based flame retardants in plastic waste

N. Mhaddolkar, G. Koinig, D. Vollprecht (AT)
Analysing suitability of existing NIR sorting technology for capturing recyclable bioplastics

SESSION B10 / / 13th October 2021 17:00-18:30
HEALTHCARE WASTE DURING COVID-19 PANDEMIC
Chair / *Presidente*: To be defined

N. Fraeyman, E. Van Braeckel, B. Verhasselt, P. De Waegemaeker, S. Mahnik, M. Hoffmann, P. Gemmel, K. Eeckloo, E. Mortier (BE)
Solid medical waste in times of corona: increased volume but no increased biohazard risk

K. Brugger (AT)
Hospital waste: a detachable worldwide problem - waste management concepts for more safety and life quality using the example of Laos in Sout-East Asia

V. Spadi, M. Boccarossa, A. Folino, L. Lombardi, F. Tatàno, P. Sirini (IT)
Environmental assessment of different residual municipal waste managements in the Marche Region (Central Italy) before and during the COVID19 pandemic

SESSION B11 / / 14th October 2021 09:00-10:30
MINIMISATION & RECYCLING OF FOOD WASTE PACKAGING
Chair / *Presidente*: To be defined

R. Stefanini, G. Vignali (IT)
Innovation in food polymeric packaging recycling: a comparative assessment of recent alternatives

G. Obersteiner, M. Cociancig, S. Luck, J. Mayerhofer (AT)
Impact of optimised packaging on the food waste prevention potential at consumer level

G. Borghesi, A. Ronzano, R. Stefanini, G. Vignali (IT)
High Pressure Processing: a solution to reduce the food waste. A Life Cycle Assessment study

E. Schmied, S. Lenz, M. Pamperl, G. Obersteiner (AT)
What happens to empty beverage cans in five European countries?

SESSION B12 / / 14th October 2021 11:00-12:30
USEFUL APPLICATION OF DIFFERENT REDISUAL MATERIALS
Chair / *Presidente*: To be defined

N. Sutthasil, H. Ishimori, T. Ishigaki, M. Yamada (JP)
The determination of adhesive properties of the organic waste

K. Opwis, T. Mayer-Gall, J.S. Gutmann (DE)
Functional textiles for the adsorption, enrichment and recovery of resources and pollutants

H. Kitamura, T. Ishigaki, H. Ishimori, M. Yamada (JP)
Metal immobilization behaviour of microbially induced carbonate precipitation by ureolytic bacteria isolated from waste landfill

S. Zueva, I. Pugacheva, I. De Michelis, N.M. Ippolito, F. Vegliò (RU)
Recycling of aluminum-containing waste and its reuse in wastewater treatment

SESSION B13 / / 14th October 2021 15:00-16:30
RECYCLING OF TEXTILE WASTE
Chair / *Presidente*: To be defined

A. Bartl, W. Ipsmiller (AT)
Textile waste: Where is the journey heading?

A.Shtukaturova, M.Šyc, B.Zach, M. Pavlas, R. Šomplák (CZ)
Textile waste streams: A case study of the Czech Republic

W. Ipsmiller, A. Bartl (AT)
Textile waste: An inventory of available and emerging recycling technologies

P. Kählig, W. Ipsmiller, A. Bartl (AT)
Investigating possibilities for the recycling of PET / cellulose mixed textile waste

M. Sharkey, D. Drage, S. Harrad, M. Coggins, H. Berresheim (IE)
Persistent organic chemicals of concern in fabrics and foams from childcare articles

SESSION B14 / / 14th October 2021 17:00-18:30
RECYCLING OF INDUSTRIAL WASTE
Chair / *Presidente*: To be defined

S. Dworak, J. Fellner (AT)
Potential and challenges of steel scrap recycling – A detailed analysis of the European scrap arisings and its quality

E. Appleby, P.J. Shaw (UK)
Packaging and residue wastes in the cosmetics sector: the case of nail varnish

S. Kalambura, S. Paixo, J. Santos, M. Girao, S. Pedro (HR)
Green optics – Educational and sustainable development project

SESSION B15 / / 15th October 2021 09:00-10:30
RECOVERY OF RESOURCES FROM WASTE IN DC'S
Chair / *Presidente*: To be defined

K. Sarquah, E. Antwi, U. Bassey, M. Hartmann, S. Narra, M. Nelles (DE)
Review of Refuse-Derived Fuel potential in Ghana for sustainable energy integration

M.C. Lavagnolo, D. Mittner, P. Fonkou, L.G. Touko Hamani, E. Elamè (IT)
Sustainable and circular solutions for waste management at Yaoundè, Cameroon

C. Weekes, E. Mijts, J. Van Caneghem (AW)
Sustainable strategies for materials and energy recovery from municipal solid waste in small island states: a case study of Aruba

S. Kalambura, D. Kalambura, S. Serti (HR)
Maldives waste management system and future circular economy plans

SESSION B16 / / 15th October 2021 11:00-12:30
WASTE MANAGEMENT IN DC'S: PROBLEMS AND SOLUTIONS
Chair / *Presidente*: To be defined

R.D. Lee (AT)
Potential applications of publicly available remote sensing data to solid waste management in developing countries

S. Dworak, R.D.Lee, J. Fellner, C. Centeno, E.Galvan (AT)
WaPla – A user-friendly software for waste management planning in developing countries

J. Cristobal, J. Kannengiesser, M. Margallo, R. Aldaco, L. Schebek, A. Irabien (ES)
Waste-related clean development mechanism projects on small island developing states: opportunities and barriers

G. Feuillade-Cathalifaud, K.N. Segbeaya, E.K. Koledzi, V. Pallier, G. Baba (FR)
Modeling the evolution of the pollution of the Kara River by the Municipal Solid Waste from Kara City (Togo)

SESSION C01 / / 11th October 2021 15:00-16:30
LANDFILL MANAGEMENT
Chair / *Presidente*: To be defined

N.M. Proietti, A. Sarno (SE)
Developing a digital platform to implement sustainable landfill management

N. Sliusar, T. Filkin, Y. Mozzhegorova, R. Garifzyanov (RU)
Integrated monitoring of waste landfills with unmanned aerial vehicles

S. Holy, J. Fellner, D. Laner, M. Schuster (AT)
Software tool for assessing the aftercare costs of landfills

J. McQuilkin, N. Proietti (SE)
GASTRAQ: Tracing and quantifying methane emissions from landfills and biogas plants using drones

SESSION C02 / / 11th October 2021 17:00-18:30
LANDFILL MINING
Chair / *Presidente*: To be defined

S. Jennings, P. Jain, R. Hixson (US)
Landfill mining as a solution to contamination, a source of cover material, and a significant capacity for future waste disposal

E. Wille, C. Isenborgs, L. Lamair, C. Neculau, R. De Rijdt, the RAWFILL Team (BE)
Cedalion and Orion: A two-step decision support tool to allow smart ELFM project planning, prioritisation and sustainable interim use (RAWFILL project)

M.A.G. Leme, C.M. Takeda, K.G. Silva, J.C.V. Silva, M.G. Miguel (BR)
Gravimetric characterization of Brazilian municipal solid waste mined from landfill for assessment of reuse potential

O. Johansson, M. Pettersson (SE)
Environmental law issues in connection with the excavation of landfills

SESSION C03 / / 12th October 2021 09:00-10:30
LANDFILL LEACHATE QUALITY & TREATMENT
Chair / *Presidente*: To be defined

C. Simongini, M. Pucetaite, S. Serranti, M. van Praagh, E. Hammer, G. Bonifazi (IT)
Microplastics identification in landfill leachates by different spectroscopic techniques

B. Staley (US)
PFAS leachate treatment breaking down the bond barrier

B. Staley, S. Bolyard (US)
Sources of tritium in municipal solid waste landfills, Detection in leachate and environmental implications

V. Grossule, R. Cossu, M.C. Lavagnolo, R. Raga (IT)
Preparation of MSW artificial leachate for treatment studies

V. Grossule, D. Fang, R. Cossu, M.C. Lavagnolo (IT)
Leachate treatment by BSF larvae: an innovative feeding

M.C. Lavagnolo, E. Marotta, M. Saleem, S. Bogialli (IT)
Leachate treatment using different plasma reactors

SESSION C04 / / 12th October 2021 11:00-12:30
LEACHATE EMISSIONS FROM LANDFILLS
Chair / *Presidente*: To be defined

L. Wang, J. Gebert, T.J. Heimovaara (NL)
Estimation of landfill emission potential with particle filtering

T.J. Heimovaara, L. Wang, J. Gebert (NL)
Quantification of the variation in emission potential under natural meteorological conditions

S. Harrad, D. Drage, M. Sharkey, H. Berresheim (IE)
Furthering understanding of emissions from landfilled waste containing POP-BFRs and PFASs (the FUEL project)

O. Hirata, R. Yanase, K. Kawase, M. Takaoka, T. Kusakabe, F. Takahashi ()
Long-term mercury behavior in mercury waste by a simulated landfill lysimeter - Mass balance of mercury dissolution and diffusion with different landfilled pattern and waste type

T.S. Bisht, D. Kumar, B.J. Alappat (IN)
Estimation of contamination potential of landfill leachate using revised Leachate Pollution Index (r-LPI)

SESSION C05 / / 12th October 2021 15:00-16:30
LANDFILL GAS QUALITY & MANAGEMENT
Chair / *Presidente*: To be defined

Z. Duan, P. Kjeldsen, C. Scheutz (DK)
Trace gas composition in LFG at Danish landfills receiving low-organic waste

C. Scheutz, Z. Duan, P. Kjeldsen (DK)
Efficiencies of gas collection systems at Danish landfills

G. M. Samim, L. Khaled, M. Marin-Gallego, M. Tazerout (FR)
Pre-feasibility study of synthetic methane production via power-to-gas integration into landfill biogas

SESSION C06 / / 12th October 2021 17:00-18:30
GAS EMISSIONS FROM LANDFILLS
Chair / *Presidente*: To be defined

B. Lotesoriere, C. Bax, L. Capelli (IT)
Implementation of a “smart” multi-sensor system with variable thresholds for the continuous monitoring of emissions from a landfill

A. Fraser-McDonald, C. Boardman, T. Gladding, S. Burnley, V. Gauci (GB)
Greenhouse gas emissions from trees planted on closed landfill sites

B.R. Nelson, R.G. Zytner, Z.L. Kanmacher, A. Yochim, R. Vaillancourt, B. Boss, Y. Dulac, A.R. Cabral (CA)
Mitigating fugitive methane emissions from closed landfills: a pilot-scale field study

K. Kissas, A. Ibrom, P. Kjeldsen, C. Scheutz (DK)
Methane emission dynamics from an old Danish landfill

SESSION C07 / / 13th October 2021 09:00-10:30
ANAEROBIC DIGESTION STRATEGIES
Chair / *Presidente*: To be defined

M.K. Manu, J.W.C. Wong (HK)
Anaerobic digestate management: challenges and opportunities

L. Laguillaumie, Y. Rafrafi, E. Paul, E. Mengelle, S. Dubos, M. Bounouba, D. Delagnes C. Dumas (FR)
Orientation of biogas recovery towards the production of methane or organic acids in anaerobic mixed cultures

M. Mainardis, F. Magnolo, C. Ferrara C. Vance. G. Misson , G. De Feo, D. Goi (IT)
Resource and energy recovery from seagrass: a life cycle-assessment approach

N. Leno, A.S.Ajayan, K.C.M. Thampatti (IN)
Carbon recalcitrance of a rapid thermochemical digestate fertilizer from degradable solid waste for climate change mitigation in the tropics

SESSION C08 / / 13th October 2021 11:00-12:30
ANAEROBIC DIGESTION: PROCESSES AND TECHNOLOGY
Chair / *Presidente*: To be defined

A. Ezieke, A. Serrano-Moral, W. Clarke, D. Villa-Gomez (AU)
Effect of Feeding Mode on Anaerobic Digestion of Fruit Waste

L. Digan, E. Mengelle, S. Dubos, M. Bounouba, C. Pagès, G. Santa-Catalina, E. Trably, H. Roux de Balmann, S. Galier, E. Paul, C. Dumas (FR)
Influence of exogenous inoculation on acidogenic fermentation of the solid waste in various pH conditions

A. Dell'Era, M. Pasquali, A. Polettini, R. Pomi, A. Rossi, T. Zonfa (IT)
Insight into the integration of dark fermentation with electrochemical methods for H2 and electricity production

L. Luo, Y. Xu, J.W.C. Wong (CN)
Exogenous additives for regulation of acidogenic fermentation of food waste in a two-phase anaerobic digestion system

SESSION C09 / / 13th October 2021 15:00-16:30
LANDFILL COVER SYSTEMS
Chair / *Presidente*: To be defined

M. Zarotti, S. Guglielmi, V. Tagarelli (IT)
A novel green technology for a safe and eco-friendly long-term slope landfill aftercare

K. Berger, V. Dunger (DE)
Water balance of landfill cover systems under the impact of predicted climate change

F. Tassi, A. Randazzo, B. Raco, P. G. Bicocchi, De Pascale, S. Venturi (IT)
Flux measurements of volatile organic compounds (VOCs) from cover soils in municipal waste landfills: theoretical vs. empirical approaches

T. Kahale, O. Ouedraogo, L. Des Alliers, J. Roger, A.R. Cabral (CA)
Impact of contaminated soils used as final cover material

M. Zhu, R. Joshi, G. Dortland (NL)
Improving ESG at landfill sites by means of closing with engineered turf capping technology

SESSION C10 / / 13th October 2021 17:00-18:30
METHANE OXIDATION
Chair / *Presidente*: To be defined

Y. Dulac, B.R. Nelson, R.G. Zytner, A. Yochim, R. Vaillancourt, B. Boss, A.R. Cabral (CA)
Determination of a critical design parameter for a passive methane oxidation biosystem

S. Yi, A. Heijbroek, J. Gebert (NL)
The effects of biochar on physical properties and methane oxidation capacity of cover soils from two Dutch landfills

R. Gregory, K O'Regan (GB)
Adapting the biowindow approach for two landfills in the aftercare phase

Z. Duan, P.O.R. Hansen, C. Scheutz , P. Kjeldsen (DK)
Mitigation of methane and trace gases through a large-scale biofilter system at Glatved landfill, Denmark

SESSION C11 / / 14th October 2021 09:00-10:30
GEOTECHNICAL ISSUES
Chair / *Presidente*: To be defined

D. Cazzuffi, P. Recalcati, L.S. Calvarano, S. Marelli (IT)
A review of direct shear and inclined plane tests results for different interfaces in landfill capping

L. Kurta, N. Kaniski, N. Hrncic, I. Petrovic, B. Kavur, E. Serdarevic, R. Savi (HR)
Shear strength of biodryed municipal solid waste

Q. Napoleoni, M. Ramundo (IT)
Study of the mechanical behaviour of Municipal Solid Waste using Triaxial tests

N. Kaniski, B. Gavez, N. Hrncic, I. Petrovic (HR)
Basic geotechnical parameters of biodried waste from winter and summer period

SESSION C12 / / 14th October 2021 11:00-12:30
HYDRAULIC ISSUES IN LANDFILLING
Chair / *Presidente*: To be defined

K. Ishii, M. Sato, S. Ochiai (JP)
Prediction of leachate generation from a landfill site using the long short-term memory model

Z. Ren, J. Chavez Olalla, L. Wang, S. Kedzia Kowalska, T. Kanen, T.J. Heimovaara (NL)
Visualizing distribution of water in a landfill using electrical resistivity tomography

S. Schmuck, M. Seyedpour, R. Widmann, T. Ricken (DE)
depSIM: numerical 3D simulation of water flows in the landfill body and in the transition area to the grown soi

K. Berger (DE)
On the new Hydrologic Evaluation of Landfill Performance (HELP) model version 4 for the water balance simulation of landfill cover systems

H. Mulleneers, D. Zegers (NL)
New developments in research and installation techniques of Trisoplast, the innovative polymer-enhanced mineral barrier

SESSION C13 / / 14th October 2021 15:00-16:30
COMPOSTING: CHALLENGES AND OPPORTUNITIES
Chair / *Presidente*: To be defined

S. Bronco, S. Doni, C. Forte, L. Trivelli (IT)
Beyond the landfill 4.0: Vermicomposting of the wet fraction from mechanical treatment of municipal solid waste and of anaerobic digestate

A. Grasserova, N.I. Navarro Pacheco, J. Semerad, A. Hanc, T. Cajthaml (CZ)
Vermiremediation of micropollutants from sewage sludge

T. Cajthaml, K. Šírová, Černá T., K. Michalíková (CZ)
Composting of sewage sludge from WWTPs contaminated by micropollutants

P. Innemanová, A. Grasserová , T. Cajthaml (CZ)
Pilot scale vermicomposting of dewatered sewage sludge from a medium-size WWTP

L. Luskar, J. Polanšek, B. Čeh (SI)
On-site composting of hop biomass with biobased polymeric twine

SESSION C14 / / 14th October 2021 17:00-18:30
COMPOSTING: CASES AND APPLICATION IN AGRICULTURE
Chair / *Presidente*: To be defined

V. Pallier, O. Toundou, K. Tozo, G. Feuillade-Cathalifaud (FR)
Impact of wastes compost on the growth and the yield of cultures of Zea mays L.: field experiments under two water regimes

K. Sobieraj, K. Giez, S. Stegenta-Dąbrowska, K. Pawęska, A. Białowiec (PL)
Assessment of vegan composts applicability

V.Z. Bogataj, P. Fajs, R. Hurding, G. Vilmorin, V. Martinez-Nogues (SI)
Cascading utilization of hop waste biomass for new products in the horticultural sector

A. Filippi, G. Cecchini, F. Cammillozzi, E. Miletto (IT)
The Acea Smart Comp project

SESSION C15 / / 15th October 2021 09:00-10:30
REMEDIATION OF CONTAMINATED SOIL
Chair / *Presidente*: To be defined

K. Haarstad (NO)
The occurrence of the water- and fireproofing fluoro alkyl (PFAS) substances in samples from a Norwegian waste handling facility and its surroundings

A. Franzetti, T. Stella, G. Cerutti, A. Tofalos, F. Formicola, S. Citterio, E. Casati, A. Francioli (IT)
Biological treatment of hydrocarbons contaminated soil by phytoremediation and biopiles at pilot-scale

A.Checa-Fernandez, A. Santos, M. Subirán, A. Romero, C.M.Dominguez (ES)
Exploring the use of surfactants for soil washing and subsequent persulfate-based oxidation treatments

A. Santos, A. Checa-Fernandez, C.M. Dominguez, D. Lorenzo, R. García-Cervilla (ES)
Enhancement in the remediation of soil and groundwater polluted with lindane wastes by alkali addition

L. Priya, G.K. Varghese (IN)
Determination of Remediability Score for remediation liability allocation among polluters

SESSION C16 / / 15th October 2021 11:00-12:30
WASTE & AUTOMOBILES
Chair / *Presidente*: To be defined

I.D. Williams, B. Moore, R.B. Cook, N. Symonds, J.O. Bello (GB)
Construction and operation of a bespoke test system to investigate and analyze automotive tyre wear debris

A. Parchomenko, J. Gillabel, Y. Dams, T. Goelen, K.C. Vrancken (BE)
Recycling of electric vehicle batteries in Flanders – A resource effectiveness perspective

I.D. Williams, E. Lewis, I. McCarthy, R.B. Cook, J. Murray, S. Rennison (GB)
The potential of tyre and brake wear to contribute to non-exhaust airborne particulate matter

N. Generowicz, J. Kulczycka (PL)
Recovery of PGMs from catalysts as a good example of sustainable waste management in Poland

SESSION D01 / / 11th October 2021 15:00-16:30
RECOVERY OF RESOURCES FROM SEWAGE SLUDGE
Chair / *Presidente*: To be defined

L. Niero, T. Bauer, F. Morgan-Sagastume, M. Pelkonen, A. Lagerkvist (SE)
System analysis of a two-stage anaerobic digestion of sewage sludge

M. Bagheri, M. Öhman, E. Wetterlund (SE)
Techno-economic analysis of phosphorus recovery scenarios from sewage sludge ash

A. Mitzia, M. Vítková, S. Zarzsevszkij (CZ)
Laboratory application of un/treated sewage sludge for soil remediation; focus on sewage sludge mineralogy

P. Alberti (HU)
Thermal disposal and utilization system

SESSION D02 / / 11th October 2021 17:00-18:30
WORKSHOP: EDUCATION IN WASTE MANAGEMENT AND GLOBAL ENVIRONMENTAL ISSUES

Chair / *Presidente*: Rainer Stegmann (DE), Giovanni De Feo (IT)

In order to reach sustainability in all sectors of our life – including waste minimization, emission reduction and new ecological approaches in economics, agriculture and city planning – it needs the conviction, support and activities of people regardless of their profession. In order to reach this goal, adequate education is essential starting from kids in Kindergarten followed by young people in Schools and Universities independent of the subjects they are studying. In this workshop we will present ideas and examples and invite the audience for discussion and input.

SESSION D03 / / 12th October 2021 09:00-10:30
WORKSHOP: RAWFILL - MATERIAL RECOVERY BY LANDFILL MINING
Chair / *Presidente*: Claudia Neculau, Laura Lamair (BE)

The RAWFILL project (Acronym for “Supporting a new circular economy for RAW materials recovered from landFILLs”) aims at facilitating the implementation and the development of the landfill mining project in Europe. During this session, the project partners will present some major outcomes of the RAWFILL project: the advantages of the innovative landfill content characterization methodology (HADESS) combining geophysical imaging and targeted waste sampling; the two-step Decision Support Tool (DST) to allow smart enhanced landfill mining (ELFM) project planning, prioritization and interim use; the landfill miner guide, a guide to facilitate the launching of landfill mining project. Moreover, the lessons learned during the 4-year project will be presented and discussed. Introductory lectures:

C. Neculau, L. Lamair - SPAQUE (BE)
RAWFILL Project – Overview of the project findings

E. Wille, C. Isenborgs - OVAM (BE)
Stepwise Decision making (data management, ranking, categorizing)

C. Neculau, L. Lamair - SPAQUE (BE)
Presentation of HADESS, the innovative landfill content characterization methodology

L. Lamair, C. Neculau, I. Aziz, R. De Rijdt, D. Caterina, I. Isunza Manrique, C. Inauen, A. Watlet, the RAWFILL Team (BE)
Cost-benefit analysis of HADESS characterization methodology (RAWFILL project)

C.Neculau, L. Lamair, R. De Rijdt, D. Caterina, I. Isunza Manrique, C. Inauen, A. Watlet, E. Wille, C. Isenborgs, the RAWFILL Team (BE)
The Landfill Miner guide - For profitable landfill mining projects and interim use options identification - RAWFILL Project

C. Neculau, L. Lamair, R. De Rijdt, D. Caterina, I. Isunza Manrique, C. Inauen, A. Watlet, E. Wille, C. Isenborgs, the RAWFILL Team (BE)
Lessons learned and recommendations for launching landfill mining project (results of the RAWFILL project)

SESSION D04 / / 12th October 2021 11:00-12:30
WORKSHOP: SOCIO-ECONOMIC AND ENVIRONMENTAL ASPECTS OF FOOD WASTE MANAGEMENT

Chair / *Presidente*: Silvia Scherhaufer (AT)

The evaluation of socio-economic and environmental benefits (or gains) and efforts of implementing innovations for food waste prevention and reduction is critical for taking informed decisions. However, evaluation methods often face challenges when implemented in practice. Methodological robustness (e.g. precision of measurements, availability of time series data, representativeness of data samples, appropriate data validation, management of different types of uncertainty) may hinder the feasibility in practice (costs, data availability, time). The goal is to find the balance between theorical robustness and feasibility of implementation. This workshop will examine the challenges of evaluation based on practical examples. The aim of the workshop is to discuss within the scientific community common challenges of evaluation and to share experiences of how to overcome them. Challenges shall be identified and discussed along practical examples which are being implemented in current EU funded projects such as the Horizon 2020 project LOWINFOOD and other innovation actions funded under the same call. Participants from around the world are invited to join the workshop and to share their experiences to accumulate knowledge on the evaluation of food waste prevention activities. Introductory lectures:

C. Cicatiello (IT)
Rationale and practical implementation of measures against food waste

K. Lasaridi ()
Establishing food waste baselines: challenges and options

C. Giordano (IT)
Evaluation of the efficacy

N. Koseoglu (GB)
Evaluation of socio-economic impacts

S. Scherhaufer (AT)
Evaluation of environmental impacts

SESSION D05 / / 12th October 2021 15:00-16:30
WORKSHOP: X-RAY FLUORESCENCE FOR RAPID WASTE CHARACTERISATION
Chair / *Presidente*: Florian Part (AT)

This workshop provides an introduction to handheld/portable X-ray fluorescence (PXRF) instruments as a rapid and easy-to-handle tool for solid waste characterisation. PXRF allows determining the elemental composition of large sample sizes (in-situ) without any further sample preparation steps. In this way, PXRF systems can be used to monitor diverse and heterogeneous waste streams to be able to make quick decisions on their further treatment. For example, it can be decided – also on-site – within a few minutes, if the material is suitable for recycling in case it contains valuable components, or if the material has to undergo a specific treatment before disposal in case it contains hazardous substances. PXRF allows an on-site sample analysis, whereas conventional analytical instruments are located in laboratories, which means relatively few samples have to be transferred to a laboratory and need to be prepared (e.g. using microwave-assisted digestion) prior to being analysed, for instance, via ICP-OES or GC-MS. This process is time-consuming and days pass before the results are available to make a final decision on how to adequately handle different materials. Using the example of sewage sludge ashes, our PXRF results showed acceptable accuracy for the elements Ca, Cu, Fe, P, Pb, Sn and Zn, while the results for other elements, such as Cr, K and Mg, showed larger deviations from ICPOES data. The other case study on Br detection in plastics from WEEE showed that a very large sample size was feasible regarding time costs, and the lower limit of detection was sufficient for quantification. In summary, PXRF is a promising method to be used on-site for screening waste streams to quickly detect both valuable substances or contaminants, such as Cu or Br. The scope of this workshop is to provide a short introduction to the basics of PXRF and information on limitations and analytical parameters regarding the accuracy of measured concentrations. In addition, the introduction covers an overview of currently available devices and safety considerations. New findings on the analyses of sewage sludge ashes and plastics from WEEE will also be presented. Finally, a group discussion in form of a “world café” closes the workshop to allow an exchange of experiences between the groups and to specify the needs and challenges in using PXRF technology. Introductory lectures:

C. Zafiu (AT)
Principles, limitations and available PXRF devices

S. Neubauer (AT)
Application study on sewage sludge ashes

A. Jandric (AT)
Application study on plastics

SESSION D06 / / 12th October 2021 17:00-18:30
WORKSHOP: LANDFILL AND OTHER ENVIRONMENTAL SITES MONITORING VIA EARTH OBSERVATION SATELLITE DATA
Chair / *Presidente*: Yuri Ponzani, Donata Magrin (UK)

Landfill gas emissions and leachate leaks at landfills – as well as at other environmental sites (i.e., Brownfields) - can give rise to regulatory and third-party liabilities for permit holders, landowners, and other potentially responsible parties if human health, properties, or the environment are damaged, along with business interruption and reputation. Extensive sources of information are available to assist landfill operators and other stakeholders, but they often provide a snapshot impression of risk at one moment of time, and more frequent in situ assessment and monitoring can be very expensive. The main purpose of the workshop is to present to landfill operators, public authorities, but also to the scientific community how space-based remote sensing data (Earth Observation satellite data) can be used for monitoring within and nearby landfill sites to spot changes that could be linked to gaseous (methane) and liquid (leachate) emissions. Spaced-based information and data gathered can help detect and monitor emissions from landfill sites in order to better manage their risks. The collected data can also enable the data users to verify the environmental conditions and monitor their dynamics over time. Participants are invited to join the workshop to share opinions, identify challenges and feedback gathering. Introductory lectures:

Recycle2Trade (UK):

- Review of Earth Observation satellite data to monitor a landfill site and its surrounding environment

University of Leicester (UK):

- Detecting occasional methane emissions from landfills with space-borne sensors
- Monitoring vegetation health in proximity of landfill sites with satellite data
- Detecting global land surface temperature data for climate science

Recycle2Trade (UK):

- Methodological robustness (e.g., precision of measurements, availability of time series data, appropriate data validation, management of different types of uncertainty) and Results of few pilot tests

SESSION D07 / / 13th October 2021 09:00-10:30
WORKSHOP: SORTING PROCESSES IN WASTE MANAGEMENT
Chair / *Presidente*: To be defined

Introductory lectures:

K. Friedrich, G. Koinig, R. Pomberger, D. Vollprecht (AT)
Statistical modelling of sensor-based sorting processes

L. Kandlbauer, M. Enengel, R. Pomberger, R. Sarc (AT)
Statistical simulation tool for sorting processes in waste management

SESSION D08 / / 13th October 2021 11:00-12:30
WORKSHOP: BIOPLASTICS IN WASTE MANAGEMENT: SOLUTION OR NEW PROBLEM

Chair / *Presidente*: Christian Zafiu (AT)

This workshop will address the topics covering i) an overview on plastic pollution in the environment – especially in and along rivers and the relative contribution of bioplastic. ii) A comprehensive introduction into bioplastics and present main features of the test procedures that are used to investigate the content of biogenic carbon and the properties of degradability. iii) We will report on own results from laboratory-based investigations and field tests on degradability of different materials (e.g. plastic bags for collection of biowastes). iv) We will report and discuss the influence of micro- and bioplastics on soil physics and organisms. v) Based on the presented topics, we'll organize discussion groups to exchange opinions and experience with plastic pollution and bioplastics. Introductory lectures:

G. Obersteiner (AT)
Littering - (Bio)Plastics in the environment

E. Binner (AT)
Definition of bioplastics, test proceedings for testing biodegradability, do we like biodegradable plastics in composting plants

C. Zafiu (AT)
Laboratory and field studies on biodegradability of bioplastics

C. Zafiu (AT)
Influence of microplastics on the soil and soil organisms

SESSION D09 / / 13th October 2021 15:00-16:30
WORKSHOP: MANAGEMENT OF C&D WASTE
Chair / *Presidente*: Oumaya Marzouk (FR), Issam Srour (LB), Gaetano Di Mino (IT)

In developed countries, there is a growing interest and understanding of the social, environmental, and economic impact of C&D waste management. This is leading to a growth in the recycling market alleviating the pressure on landfills. In contrast, developing & lower-income countries (DLIC) fall behind in terms of recycling and, generally, in implementing effective C&D waste management practices. Large amounts of waste are sent to landfills and, in some countries, even larger amounts are dumped illegally in environmentally sensitive areas (e.g., riverbeds, hillsides). As the management of C&D waste is a multidimensional issue that incorporates political, institutional, social, environmental, and economic aspects, practitioners and researchers in DLICs should focus on these different aspects to design and implement a sustainable management system. Therefore, the objective of the first part of this workshop is to discuss and share findings on: Good C&D waste management practices and feedback / Political instrument / C&D supply chain and logistics / Economic aspects / Sustainable development approach / Adapted technological transfer / C&D waste management standards and tools. The C&D waste, considered as a resource for road construction, is the second issue of this workshop. The valorization of these secondary materials strictly depends on the demand of stakeholders such as companies and road authorities for new infrastructures and for the maintenance of existing ones. Therefore, with the aim of implementing circular economic models in the road construction sector, it is needed to know the potential market of this material within the road construction sector of DLICs. The goals of the second part are: The relation supply demand of aggregates in road construction / The production of C&D waste over historical series / The expected production of C&D waste over the next 5 years / Boundaries and limits for recycling of C&D waste in road construction sector.

SESSION D10 / / 13th October 2021 17:00-18:30
WORKSHOP: HYDROTHERMAL TREATMENT
Chair / *Presidente*: Anders Lagerkvist (SE)

HTT has a great potential for treatment of organic wastes: Why is it not used more often? Different aspects of this issue will be discussed by a panel of researchers. More details will be released shortly.

SESSION D11 / / 14th October 2021 09:00-10:30
WORKSHOP: IMPLEMENTATION OF CIRCULAR ECONOMY IN CONSTRUCTION
Chair / *Presidente*: Mohamed Osmani (UK)

The construction industry plays a leading role in improving the quality of the built environment, but its activities also impact on the wider environment in several ways, including waste production. For example, Construction and demolition activities in the European Union are responsible for generating 850 million tons of construction and demolition waste (CDW) per year, accounting for 35% of the total waste generation. Diverting CDW from landfill has a global political profile today unrivalled in recent historical times. Indeed, the last two decades saw a combined plethora of global, European and national waste related legislation, policies, strategies and guidance documents to curb CDW production and increase recycling rates. Similarly, an ever-increasing international research on CDW has been conducted ranging from ‘soft’ mapping and management, and reduction tools and methodologies to ‘hard’ treatment and recycling technologies. However, the current state-of-research is largely dominated by endeavors to manage waste that has already been produced. Although several policy and industry initiatives have been instigated across the world to change behaviors and practices to break away from a linear model of resource use, the application of the concept of circular economy thinking in construction is limited and piecemeal. Despite the growing interest in the circular economy, it has been difficult to promote a large-scale implementation of circularity principles in construction given the dominance of it traditional linear model, and many questions remain. What are the barriers that impede circularity uptake in construction? What are the enablers and incentives that could drive circular economy implementation in construction? As such, the workshop will identify and appraise circular economy systematic enablers in construction and highlight examples of circularity methods, tools, and case studies from research and industry projects.

SESSION D12 / / 14th October 2021 11:00-12:30
WORKSHOP: DATA MANAGEMENT AND DIGITALIZATION OF LANDFILLS
Chair / *Presidente*: Nicolas Marino Proietti (IS), Alessandro Sarno (SE)

The scope of the workshop is to invite participants to define the extend and type of data related to landfills and their relationship with the site's stakeholders. In the second part we will go through the process of digitalization and how it can be implemented with real life examples and experience sharing from the participants.

Agenda:

- Presentation of different type of data for a landfill site (type of acquisition, methods, etc.) by Nicolas Proietti from ReSource International ehf., Senior consultant

- Workshop session: in groups participants will define the type of data they can think of related to landfills, what are the data used for, how is it reported:
  - List up all data available according to you on a landfill
  - Determine data types and regroup your items into each type
  - Stakeholder analysis – which groups are linked to what data?
  - Results gathering from different groups and conclusions

- Digitalization of landfill: presentation on data acquisition and digitalization (UAV, modelling, databases, BIG DATA, etc.) by Nicolas Proietti from ReSource International ehf., Senior consultant

- Workshop session in groups: Digitalization implemented on landfills
  - Define the steps in digitalization of landfills;
  - What problems are stopping landfill to go into a digital form?
  - Results gathering from different groups and conclusions

SESSION D13 / / 14th October 2021 15:00-16:30
WORKSHOP: GEOSYNTHETICS USE IN BARRIER SYSTEMS
Chair / *Presidente*: Daniele Cazzuffi (IT)

The workshop will present the state-of-the-art for the application of drainage geosynthetics in landfill barrier systems. The development of their use for drainage and filtration functions will be illustrated, including the drainage of rainwater on capping applications, biogas management, use of drainage geosynthetics in leachate collection layers and as part of double lining systems. Recent developments will be presented: new products with enhanced friction resistance, structures with enhanced resistance to creep or geotextile intrusion. Aspects related to the development of international standards and guidelines will be outlined, as well as the contribution of geosynthetics to sustainable development in civil engineering. Introductory lectures:

E. Blond (CA)
Designing geocomposites drains in leachate collection layers and double lining systems

P. Rimoldi (IT)
Designing geocomposites drains for hydraulic capacity: current codes and standards

P. Recalcati (IT)
Designing geocomposites drains for veneer stability

M.C. Mandaglio, S. Bilardi, N. Moraci (IT)
Relevance of soil geotextile filter long term behaviour on the design of environmental and civil works

D. Shercliff ()
Contribution of geocomposite drains and other geosynethics to a better sustainability of landfill lining systems

C. Tarnowski ()
Use of geocomposite drains for leachate recirculation in bioreactors

SESSION D14 / / 14th October 2021 17:00-18:30
WORKSHOP: PERFORMANCE OF METHANE OXIDATION SYSTEMS
Chair / *Presidente*: 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. The assessment of the full-scale oxidation performance on the landfill is of particular interest not only for the landfill operator but also for (local) authorities, and of course still for the scientific community. However, the reliable and (cost)effective monitoring and assessment of the oxidation performance in the field – particularly on biocovers or larger biowindows - is still highly challenging. The main purpose of the proposed workshop is therefore to discuss options and approaches for monitoring and controlling the performance of full-scale engineered methane oxidation systems. Three to four short pitches will be given by invited speakers who will share concrete aspects and experiences with performance control and monitoring of large/full-scale methane oxidation systems. As main outcome it is intended to provide a list of currently applied monitoring methods and approaches including framework conditions for application and key points of success and concern, that can be incorporated in guiding documents to be composed by TG CLEAR. Introductory lectures:

C. Geck, J. Streese-Kleeberg, J. Gebert (NL)
Experiences with 5 years of monitoring full scale biowindows in Hamburg, Germany

A. Cabral, A. Abedini (CA)
Monitoring of CH4 oxidation systems in Canada

M. Huber-Humer (AT)
Monitoring of biocovers - chamber versus laser/open-path based approaches

C. Scheutz, P. Kjeldsen (DK)
Monitoring of full scale Danish biocovers

SESSION D15 / / 15th October 2021 09:00-10:30
WORKSHOP: WASTE & HEALTH
Chair / *Presidente*: Raffaello Cossu (IT)

Introductory lecture:

R. Cossu, M. Ferrante (IT)
The Italian Committee for Waste and Health: Report on two years activity

SESSION D16 / / 15th October 2021 11:00-12:30
WORKSHOP: TEXTILES IN CIRCULAR ECONOMY
Chair / *Presidente*: Andreas Bartl, Wolfgang Ipsmiller (AT)

Textiles and textile waste have recently gained great importance. Due to a new EU directive, textiles are counted as municipal waste and from 2025 at the latest, municipalities will have to organize a separate collection of end-of-life textiles. Therefore, a significantly larger amount of collected end-of-life textiles can be expected in the near future. While reuse is to be welcomed in principle, it is already reaching its limits. Within the EU, second-hand clothing is only marketable to a very limited extent, so that the majority is exported, primarily to developing countries. This market is also already saturated and the local textile industry is coming under increasing pressure, so that some African countries have already imposed import bans. It is therefore clear that in the coming years, an increasing volume of end-of-life textiles will have to be reused or recycled in the EU. Separate collection of end-of-life textiles is only moderately developed in a few EU countries. The mandatory collection from 2025 must shift the costs (which will be higher than today) from the general public to the causer (e.g., extended producer responsibility - EPR). The fees of such a system must not only fund the collection itself but also the costs for re-use (including repair activities) and recycling. The fees for placing new textiles on the market must be designed in such a way that appropriate pressure is exerted on the design of the products. "Design-for-longevity", "design-for-repair", design-for-re-use” or "design-for-recycling" must no longer be pious wishes, but must pay off on the basis of the fees. The fees must also fund research and development of new recycling technologies, which will then exhibit economic and environmental benefits. However, not only the symptoms should be tackled, but also their causes. Finally, the volume of textiles put to the market must be reduced and the fast fashion business model must be replaced by a more sustainable one.

Introductory lectures:

P. Kählig, W. Ipsmiller, A. Bartl (AT)
To improve automatic sorting and recycling of waste textiles

E. Boschmeier, A. Bartl, W. Ipsmiller (AT)
Introduction to System Circularity and Innovative Recycling of Textiles (SCIRT)

A. Shtukaturova, M. Šyc, B. Zach, M. Pavlas, R. Šomplák (CZ)
Textile waste treatment in the Czech Republic

P.J. Shaw (UK)
The clothing and textile sector: waste and resources perspectives

M. Šyc, A. Shtukaturova, B. Zach, M. Pavlas, R. Šomplák (CZ)
Socio-economic issues of textile waste treatment in the Czech Republic

W. Ipsmiller, E. Ipsmiller, A. Bartl (AT)
Dead white men’s clothes: Is apparel re-use the best solution?

POSTER SESSION / 11th - 15th October 2021 / 09:00-17:00

M.A. Habib (EG)
Adding value to lampante oil: high quality leather fatliquoring agent via the low- grade oil sulfonation

H.-H. Carstensen, J. Ruiz, I. Fonts, N. Gil-Lalaguna, J. Ceamanos, M.B. Murillo, G. Gea (ES)
CO2 adsorption on char from rich-protein animal wastes and pure proteins. A comparative study

H. Manohar, G.K. Varghese (IN)
Analysis of heavy metal adsorption pattern in soil columns for environmental forensic Applications

V. Innocenzi, S. Zueva, V. Corradini, I. De Michelis, F. Ferella, F. Vegliò (RU)
A case study on the wastewater treatment in the semiconductor industry

A. Del Borghi, L. Moreschi, S. De Angeli, M. Gallo (IT)
Waste to aggregate: an application of circular economy to aquaculture evaluated through a life-cycle approach

A. Marrone, D. La Russa, E. Brunelli, G. Santovito, D. Pellegrino (IT)
Antarctica as a global sensor of transboundary pollution: metals biomonitoring in a twelve-year period

R.S. Jasna, A. Sekar, G.K. Varghese (IN)
The air quality profile during COVID-19 lockdown as a forensic tool for air pollution source identification

M. Jadlovec, J. Čespiva, J. Výtisk, S. Honus, T. Ochodek, K. Borovec (CZ)
Utilisation of solid recovered fuel ash as sorbent for mercury capture

J. Čespiva, M. Jadlovec, J. Výtisk, T. Ochodek, S. Honus, K. Borovec (CZ)
Products of solid recovered fuel gasification in unique pilot-scale unit

B. Seo, M. Lee, J. Chung (KR)
Applicability and environmental benefits of alternative resource recovery processes by substituting conventional leaching

I. Pecorini, E. Rossi, S. Di Gregorio, S. Becarelli, R. Iannelli (IT)
Comparison of wet and dry anaerobic digestion of OFMSW with a focus on microbial Characteristics

P. Prawisudha, H.S. Ahmad, A.S. Nugroho (ID)
Hydrothermal-pyrolysis system as a sustainable communal-scale treatment for mixed Municipal Solid Waste

ACTIVE LAB 01-02 / 11th October 2021 / 15:00-18:30
SAMPLING OF GRANULAR WASTE
Chair / *Presidente*: Alberto Pivato, Giovanni Beggio (IT)

Data reliability, considered in terms of uncertainty and variability, is determined by the analytical methods and the performed sampling procedures. The influence of this latter increases with highly heterogeneous materials characterized by the presence of trace, “rare” elements (both considered resources or contaminants), as occurring in the field of waste management. Nevertheless, the theoretical principles behind representative sampling are still not well understood in the waste community, which often underestimates its influence on the reliability of the resulting data and consequent decisions.

A practical experience will be organized where participants will explore the following topics:

- Definition of the concepts of representativeness and uncertainty related with sampling;
- Calculation of the size of a waste laboratory sample;
- Assessment of the granulometric and physical characteristics of the waste under investigation;
- Production of composite samples collected from a real heap;
- Design of a sampling plan;
- Data reporting.

ACTIVE LAB 03-04 / 13th October 2021 / 15:00-18:30
DIRECT TEST METHODS FOR HAZARDOUS WASTE CLASSIFICATION
Chair / *Presidente*: Lorenzo Maggi, Erica Tediosi (LabAnalysis, IT)

Programme overview

Aquatic ecotoxicity
1. What an ecotoxicological test is
2. Preparation of test solutions (dissolution of wastes in water)
3. Fish acute toxicity test: selection of fish, fish exposure, toxicity determination
4. *Daphnia magna* acute toxicity test: description of *Daphnia magna*, *Daphnia* exposure, toxicity determination
5. Algal growth inhibition test: algae characteristics, algal exposure and growth, determination of growth inhibition
6. *Daphnia magna* reproduction test: description of the test, determination of reproduction and inhibition evaluation

In vitro toxicology
1. What an *in vitro* test is
2. Dermal irritation and dermal corrosion: description of tissues, exposure and determination of toxicity

ACTIVE LAB 05-06 / 14th October 2021 / 15:00-18:30
SAMPLING AND ANALYSIS OF MICROPLASTICS IN SEA WATER AND ON THE BEACH
Chair / *Presidente*: Claire Gwinnett (UK)

Have you ever wondered how scientists sample and analyse microplastic pollution? Come and join the Microplast Active Lab and get hands-on experience in sampling and analysing microplastic pollution!

Programme overview
Plastic pollution is a global problem and acknowledged to be one of our major environmental challenges. Poor waste management has led to plastic pollution being found in all compartments of our environment, including our aquatic, atmospheric and terrestrial systems. Microplastics (polymers smaller than 5mm in size) have been found in even the remotest locations including the Arctic, the deep sea and on Everest. Understanding the abundance and type of microplastics in our different environments is important for risk assessments and the development of mitigation activities.
In this 4-hour active lab, we will sample both sediment and water from key locations along the Forte Village Resort beach using protocols developed to reduce contamination during sampling. You will then transport your samples back to the "lab" and learn how to recover any microplastics using filtering and density separation methods. Once recovered, you will conduct simple analysis whilst learning about additional techniques that may be employed to fully characterise samples and help identify source.
Interpretation of the results will provide us estimates of microplastic pollution in the local environment and help us understand possible waste management initiatives that could be employed.