INTERNATIONAL WORKSHOP ON

Sustainable & Circular Technologies

26-27 NOV 2025, EINDHOVEN

Organised by

MINICOR
CUMERI
ICONIC
CONFETI
Bio-Flex CLC
DAM4CO2
BIOMeGaFuel
DESIRED
ECOLEFINS
CO-IONICS FOR CARBON NEGATIVE PETROCHEMICALS
MEMCAT
CARBIOW
CATART
superval

1CUBE

Funded by the European Union

PROGRAM

Wednesday 26th November

8:15 - 9:00	Registration	
9:00 - 9:15	START CONFERENCE & GREETINGS	
9:15 - 10:00	PLENARY 1	
10:00 - 11:00	PANEL DISCUSSION I	
11:00 - 11:20	Coffee break	
11:20 - 13:00	Session 1	Session 2
	Membrane & Electrochemical Technologies	Catalysis & Photochemical Processes
13:00 - 14:00	LUNCH	
14:00 - 14:45	PLENARY 2	
14:45 - 16:45	Session 3	Sesssion 4
	Carbon Capture & Separation	Renewable Fuels & Products
18:00 - 20:00	Social event & dinner	

Thursday 27th November

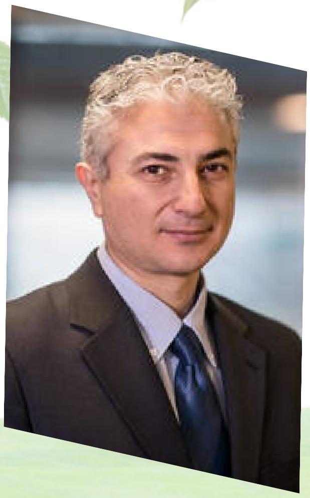
8:30 - 9:00	Registration	
9:00 - 10:00	PANEL DISCUSSION II	
10:00 - 10:30	Coffee break	
10:30 - 12:30	Session 5	Session 6
	CO_2 Conversion Technologies	Sustainability & Circular Economy
12:20 - 13:30	LUNCH	
13:30 - 14:30	PANEL DISCUSSION III	
14:30 - 15:50	Session 7	Session 8
	Integrated & Modular Systems	Systems Analysis & Emerging Challenges
15:50 - 16:30	Roundtable & discussion - closure	

Acknowledgement

The projects sponsoring this workshop received support from the Horizon Europe under grants agreement reported below

Acronym	Project title	Website	Grant agreement
Bio-FlexCLC	Flexible chemical looping combustion for combined heat and power production from biogenic residues with negative emission	https://www.bioflexclcproject.eu/	101147904
Bio-MeGaFuel	Bio Methanol Production via Chemical Looping Gasification Coupled with Membrane Reactors	https://www.biomegafuelproject.eu/	101147737
CARBIOW	Carbon Negative Biofuels from Organic Waste	https://carbiow.eu/	101084443
CATART	Reaction robot with intimate photocatalytic and separation functions in a 3-D network driven by artificial intelligence	https://catartproject.eu/	101046836
CONFETI	Electrochemical and sun-driven technology for green fertilisers	https://confetiproject.eu/	101115182
CUMERI	Customised membranes for green and resilient industries	https://cumeri.eu/	101091812
DAM4CO2	Double-Active Membranes for a sustainable CO_2 cycle	http://www.dam4co2.eu/	101115488
DESIRED	Direct co-processing of CO_2 and water to sustainable multicarbon energy products in novel photocatalytic reactor	https://desired-project.eu/	101083355
ECOLEFINS	Nano-Engineered Co-Ionic Ceramic Reactors for CO_2/H_2O Electro-conversion to Light Olefins	https://ecolefinsproject.eu/	101099717
ICONIC	Integrated COnversion of NItrate and Carbonate streams	https://iconicproject.eu/	101115204
MEMCAT	Membrane-assisted Ethylene Synthesis over Nanostructured Tandem Catalysts	https://www.memcatproject.eu/	101130047
MINICOR	MILD Combustion with Nitrogen and Carbon Dioxide Reforming	https://www.minicor-project.eu	101115506
SUPERVAL	SUstainable Photo-ElectRochemical VALorization of flue gases	https://superval.eu/	101115456

Welcome from our chairman



"Welcome everyone to our Workshop on Sustainable and Circular Technology that brings together researchers, industry partners committed to reducing resource use, closing material loops, and developing technologies that support long-term environmental resilience. Throughout the sessions, we will share practical pathways, exchange experiences, and highlight opportunities to accelerate sustainable solutions across sectors, from advanced materials and energy systems to waste valorisation and circular industrial processes.

A special thank-you goes to the 13 projects co-organizing this event. Your collaboration, expertise, and commitment have made this workshop possible and exemplify the power of working together toward shared goals.

Prof. Fausto Gallucci
Senior Consultant, 1 Cube b.v
Professor, TU Eindhoven

Plenary speakers

Prof. John Irvine

School of Chemistry
University of St. Andrews, UK

Prof. John T.S. Irvine CBE, FRSE, FRSC has made a unique and world-leading contribution to the science of energy materials, especially fuel cell and energy conversion technologies. This research has ranged from detailed fundamental to strategic and applied science and has had major impact across academia, industry and government. Prof. Irvine's science is highly interdisciplinary extending from Chemistry and Materials through physics, bioenergy, geoscience, engineering, economics and policy.

Professor Michele Aresta

Professor, University of Bari Aldo Moro
Honorary Professor, University of Tianjin, China
CEO, IC2R

Prof. Michele Aresta is an internationally recognized chemist and pioneer in carbon dioxide utilization and sustainable chemistry. His groundbreaking research has focused on transforming CO_2 from waste into valuable chemical feedstocks, advancing the circular carbon economy. Professor Aresta founded the International Conference on Carbon Dioxide Utilization (ICCDU) and has played a major role in shaping global policy and scientific understanding of CO_2 chemistry.

26th November - Room 1

8:15 - 9:00 Registration

9:00 - 9:15 Start Conference
- Greetings from Chairman, Prof. Fausto Gallucci

9:15 - 10:00 PLENARY 1 - Prof. Michele Aresta
CO_2 as main source of carbon alternative to fossil-carbon: targeting high selectivity in coprocessing CO_2 and water under solar irradiation

10:00 - 11:00 PANEL DISCUSSION I [Bio-MeGaFuel, Bio-FlexCLC, CARBIOW, DESIRED]
Advanced biofuels and biomass conversion

Chair - Dr. Yury Kolen'ko (International Iberian Nanotechnology Laboratory)

Panels - Dr. Amir Soleimani Salim (Research Institutes of Sweden), Ali Hedayati (IVL Swedish Environmental Research Institute), Prof. Angela Dibenedetto (University of Bari Aldo Moro)

11:00 - 11:20 Coffee break

Session 1 - Membrane & Electrochemical Technologies
Chair - Prof. Tom Breugelmans (University of Antwerp)

11:20 **Presentation 1-1: Dr. Hannes Richter (Fraunhofer Institute for Ceramic Technologies and Systems IKTS)**
Resource recovery and CO_2 capture from steel coke oven gas: innovative SiC/SiCN membranes for H_2 recovery [CUMERI]

11:40 **Presentation 1-2: Dr. Yury Kolen'ko (International Iberian Nanotechnology Laboratory)**
Membrane-assisted Ethylene Synthesis over Nanostructured Tandem Catalysts [MemCat]

12:00 **Presentation 1-3: Prof. Fausto Gallucci (Eindhoven University of Technology)**
Membrane reactors for biomethanol synthesis [Bio-MeGaFuel]

12:20 **Presentation 1-4: Dr. Vincenzo Vigna (CNR-ITM)**
Machine Learning-Based Insight into the Structure–Property Relationships for Permeability and Selectivity in Gas Separation Membranes [DAM4CO2]

12:40 **Presentation 1-5: Oriol González Prats (Universitat Autònoma de Barcelona)**
CO_2 capture and electrolyte materials based on task-specific ionic liquids [CONFETI]

13:00 - 14:00 Lunch break

14:00 - 14:45 PLENARY 2 - Prof. John Irvine
Interface engineering for electrochemical CO_2 conversion

Session 3 - Carbon Capture & Separation
Chair - Dr. Amir Soleimani Salim (Research Institutes of Sweden)

14:45 **Presentation 3-1: Dr Miren Etxeberria-Benavides (Tecnalia)**
Resource recovery and CO_2 capture from steel coke oven gas: Hollow fibre PEBA membranes for CO_2 capture [CUMERI]

15:05 **Presentation 3-2: Prof. Ferdinando Costantino (University of Perugia)**
Aluminum and zirconium fumarate analogue MOFs based on C4 linkers with different functionalities. Structural insights and CO_2 absorption properties [DAM4CO2]

15:25 - 15: 45 Coffee break

15:45 **Presentation 3-3: Dr. Stefano Giancola (Orchestra Scientific SL)**
Unlocking Affordable & Sustainable CO_2 Capture & Purification [SUPERVAL]

16:05 **Presentation 3-4: Dr. María Teresa Izquierdo (Spanish National Research Council CSIC)**
Operational key issues in the development of flexible Bio-CLC [Bio-FlexCLC]

16:25 **Presentation 3-5: Dr. Davide Scarpa (University of Antwerp)**
Unlocking Green Urea: Investigating Reactor Parameters for Electrochemical Synthesis from CO_2 and NO_3^- [CONFETI]

18:00 - 20:00 Social event & dinner *(1st floor, Aristo center)*

26th November - Room 2

Session 2 - Catalysis & Photochemical Processes

Chair - Prof. Iker Aguirrezabal (University of the Basque Country)

11:20 **Presentation 2-1: Dr. Annette Trunschke (Fritz Haber Institute of the Max Planck Society)**
From Waste to Resource: Catalytic Strategies for CO_2 Valorization [MemCat]

11:40 **Presentation 2-2: Prof. Karoliina Honkala (University of Jyväskylä)**
Modelling CO_2 catalytic conversion to valuable products [MemCat]

12:00 **Presentation 2-3: Dr. Sonia Zoltowska (Max Planck Institute of Colloids and Interfaces)**
Carbon nitride caught in the act of photocatalysis: CO_2 reduction decoded [CATART]

12:20 **Presentation 2-4: Prof. Renata Solarska (University of Warsaw)**
Interface-Engineered Cu-Based Photocathodes For Stable and Selective PEC CO_2 Reduction [DESIRED]

12:40 **Presentation 2-5: Ilaria Berruti (PSA-Ciemat)**
Solar-Driven Photocatalysis for Nitrate Remediation [CONFETI]

13:00 - 14:00 Lunch break

Session 4 - Renewable Fuels & Products

Chair - Dr. Ali Hedayati (IVL Swedish Environmental Research Institute)

14:45 **Presentation 4-1: Marc Siodlaczek-Fach (Technische Universität Darmstadt)**
Fluidised bed oxygen-steam gasification of torrefied biogenic residue with an oxygen carrier bed material [CARBIOW]

15:05 **Presentation 4-2: Prof. Michalis Konsolakis (Technical University of Crete)**
Rational design of non-noble metal nanostructured catalysts for CO_2 hydrogenation to value-added products [ECOLEFINS]

15:25 - 15: 45 Coffee break

15:45 **Presentation 4-3: Dr. Mara de Joannon (CNR-STEMS)**
MILD combustion and Dry reforming for CO_2 and pyrolysis by-products valorization [MINICOR]

16:05 **Presentation 4-4: Dr. Frederik Ossler (Lund University)**
Biochar Synthesis and Characterization for Soil Amendment Applications and Environmental Control [MINICOR]

16:25 **Presentation 4-5: Asier Oleaga (Tecnalia)**
Oxy-fired fluidised bed carbonated wastes digital CO_2 uptake monitoring and its use as SCM in lower footprint cement-based products [CARBIOW]

27th November - Room 1

8:30 - 9:00 Registration

9:00 - 10:00 PANEL DISCUSSION II [DAM4CO2, CATART, MemCat, SUPERVAL]

Carbon dioxide capture and utilization

Chair - Dr. Anita Buekenhoudt (Flemish Institute for Technological Research VITO)

Panels - Dr. Alessio Fuoco (National Research Council CNR-ITM), Prof. Iker Aguirrezabal (University of the Basque Country), Dr. Yury Kolen'ko (International Iberian Nanotechnology Laboratory), Prof. José Ramón Galán (Institute of Chemical Research of Catalonia)

10:00 - 10:30 Coffee break

Session 5 - CO_2 Conversion Technologies

Chair - Dr. Alessio Fuoco (National Research Council CNR-ITM)

10:30 **Presentation 5-1: Saloa Vaquero (University of the Basque Country)**
Photocatalytic and surface consequences of thermal treatments on carbon nitrides for CO_2 into CO conversion [CATART]

10:50 **Presentation 5-2: Dr. Andrea Moranti (Politecnico di Torino)**
Multiphysics modeling of Co-Ionic Ceramic Reactors for CO_2/H_2O Electroconversion to Light Olefins [ECOLEFINS]

11:10 **Presentation 5-3: Dr. Hermenegildo Garcia Baldovì (Universitat Politècnica de Valencia)**
Recycling CO_2 from flue gas through catalysis using affordable materials [DAM4CO2]

11:30 **Presentation 5-4: Dr. Ruud Kortlever (Delft University of Technology)**
Operational effects on CO_2 and nitrate co-reduction for urea electrosynthesis [ICONIC]

11:50 **Presentation 5-5: Philipp Mohn (Technische Universität Darmstadt)**
Pilot testing and techno-economic evaluation of chemical looping combustion [Bio-FlexCLC]

12:10 **Presentation 5-6: Pamela Khawandi (University of Antwerp)**
Understanding the Interplay Between Reaction Conditions to Enhance Urea Electrosynthesis on Ag Electrode [CONFETI]

12:30 - 13:30 Lunch break

13:30 - 14:30 PANEL DISCUSSION III [MINICOR, CONFETI, ECOLEFINS, CUMERI, ICONIC]

Nitrogen and CO_2 capture

Chair - Prof. Fausto Gallucci (Eindhoven University of Technology)

Panels - Dr. Mara de Joannon (CNR-STEMS), Prof. Gonzalo Guirado Lopez (Universitat Autònoma de Barcelona), Prof. George Marnellos (Aristotle University of Thessaloniki), Dr. Anita Buekenhoudt (Flemish Institute for Technological Research VITO), Dr. Ruud Kortlever (Delft University of Technology)

Session 7 - Integrated & Modular Systems

Chair - Prof. Angela Dibenedetto (University of Bari Aldo Moro)

14:30 **Presentation 7-1: Jasper Schuurman (University of Amsterdam)**
Light-assisted CO_2 reduction in an automated photoreactor system coupled to carbonylation chemistry [CATART]

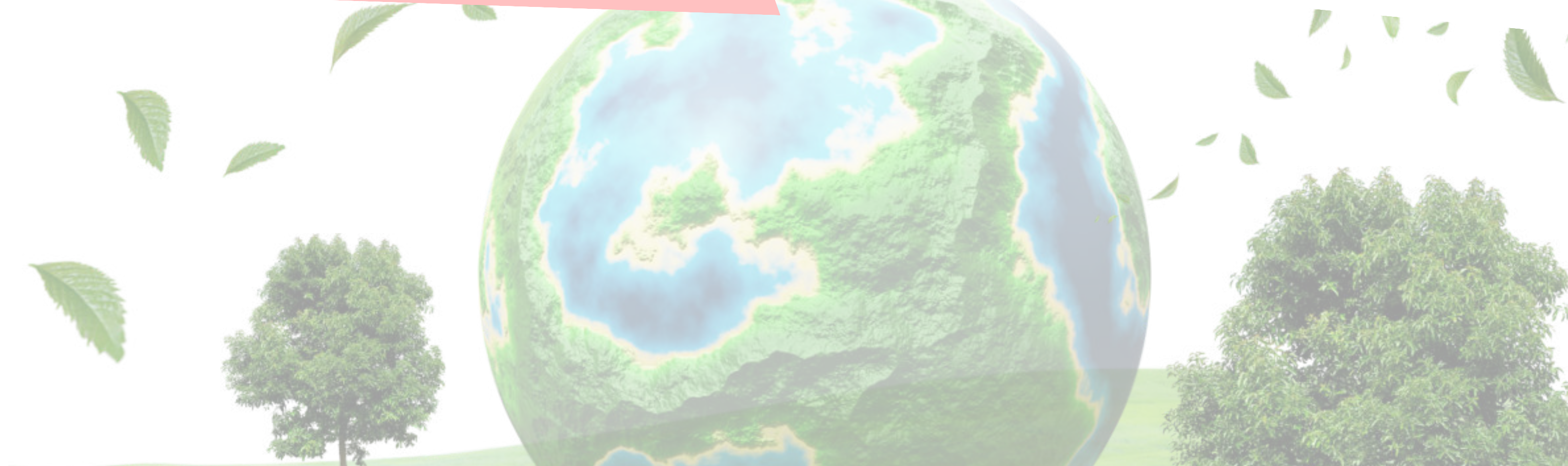
14:50 **Presentation 7-2: Dr. Viktoriia Holovanova (Institute of Photonic Sciences, ICFO)**
Advancing urea quantification at the trace level [ICONIC]

15:10 **Presentation 7-3: Prof. Vassilis Kyriakou (University of Groningen)**
Efficient steam electrolysis electrodes for proton conducting ceramic electrochemical reactors [ECOLEFINS]

15:30 **Presentation 7-4: Daniël Emmery (Modelta b.v.)**
A cloud-based membrane unit operation for process simulation environments

15:50 - 16:30 Roundtable and discussions - closure

27th November - Room 2



Session 6 - Sustainability & Circular Economy
Chair - Prof. Michele Aresta (University of Bari)

10:30 **Presentation 6-1: Dr. Anita Buekenhoudt (Flemish Institute for Technological Research VITO)**
Membrane-based re-refining of base oil ensuring low CO_2 impact and maximal resource recovery [CUMERI]

10:50 **Presentation 6-2: Dr. Avishek Goel (GIDARA Energy b.v) & Philipp Eiden (Technische Universität Darmstadt)**
Gasification of biogenic residues and wastes for production of renewable syngas [Bio-MeGaFuel]

11:10 **Presentation 6-3: Dr. Francisco García Labiano (Consejo Superior de Investigaciones Científicas)**
Chemical Looping gasification of biogenic residues and wastes for production of renewable syngas. [Bio-MeGaFuel]

11:30 **Presentation 6-4: Dr. Haryo Wibowo (Lund University)**
Biomass Conversion for the Sustainable Production of Syngas Coupled with Carbon Dioxide and Nitrogen Management: An Overview of the MINICOR Project [MINICOR]

11:50 **Presentation 6-5: Prof. Jose Ramon Galan-Mascaros (Institute of Chemical Research of Catalonia ICIQ)**
An opportunity for the valorization of flue gas contaminants into valuable chemicals [SUPERVAL]

12:10 **Presentation 6-6: Dr. Laura Talens (Universitat Autònoma de Barcelona)**
Ecodesign parameters for more sustainable technologies [CONFETI]

12:30 - 13:30 Lunch break

Session 8 - Systems Analysis & Emerging Challenges
Chair - Prof. Vassilis Kyriakou (University of Groningen)

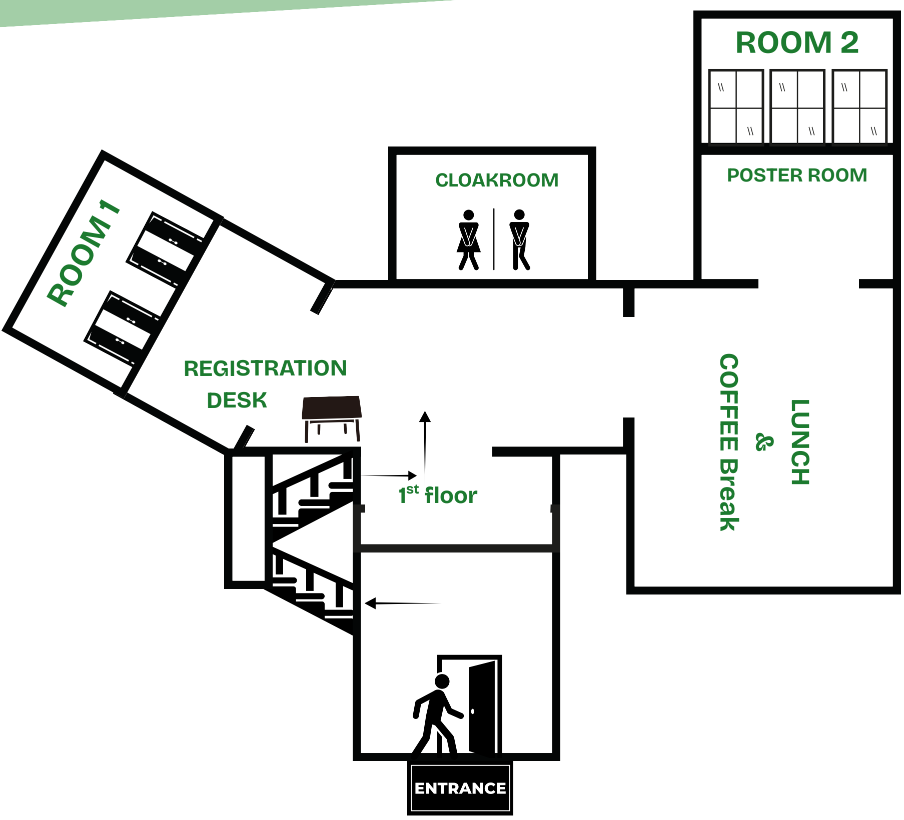
14:30 **Presentation 8-1: Dr. Yoran De Vos (Flemish Institute for Technological Research VITO)**
3D Printing and Preparation of Catalyst Monoliths for Fischer–Tropsch Synthesis [CARBIOW]

14:50 **Presentation 8-2: Dr. Zhimian Hao (Delft University of Technology)**
Targeting Electrochemical Performance Metrics for e-Urea Production: A Systems-Level Perspective [ICONIC]

15:10 **Presentation 8-3: Susanne Gooijer (Eindhoven University of Technology)**
Predictive computation modelling for the separation of flue gas components [SUPERVAL]

15:30 **Presentation 8-4: Dr. Vafa Feyzi (IMDEA Energy Institute)**
Life cycle sustainability assessment of photoactivated processes for CO2 reduction and fuel production: from Lab data into the Industrial scales [DESIRED]

Location map



1st floor, Aristo Meeting (Vestdijk 30, Eindhoven)