



**INTERNATIONAL SYMPOSIUM
„THE ENVIRONMENT AND THE INDUSTRY“**



**23rd INTERNATIONAL SYMPOSIUM
“THE ENVIRONMENT AND THE INDUSTRY”**

BOOK OF ABSTRACTS

Romania, September 24-25, 2020

Online Event, www.simiecoind.ro

**23rd International Symposium “The Environment and the Industry” –
E-SIMI 2020**

Editors:

Ph.D. Chem. Luoana Florentina PASCU

Ph.D. Eng. Carol Blaziu LEHR

Ph.D. Eng. Gabriela Geanina VASILE

Ph.D. Eng. Alina Mirela CONSTANTIN

Proofing:

Eng. Cristian SERBANESCU

Graphic design Alina TANASESCU

Publisher: National Research and Development Institute for Industrial Ecology ECOIND, Drumul Podu Dambovitei Street no. 71-73, district 6, Bucharest, Romania

www.simiecoind.ro

ISSN-L: 1843-5831

DOI: <http://doi.org/10.21698/simi.2020>



Library of R&D Institute for Industrial Ecology



Organizers

23rd International Symposium

“The Environment and the Industry”, E-SIMI 2020

under Honorary Patronage of:

Romanian Academy

under Coordination of:

Ministry of Education and Research

Ministry of Environment

Ministry of Water and Forests

Ministry of Economy

Organized by:

National Research and Development Institute for Industrial Ecology
– ECOIND

Co-organized by:

Romanian Society of Chemistry

Romanian Water Association

Romanian Environment Association 1998

Honorific Committee

Dragos Mihael CIUPARU – Secretary of State for Research

Monica Cristina ANISIE - Ministry of Education and Research

Costel ALEXE – Ministry of Environment, Waters and Forests

Acad. Ioan Aurel POP – President of Romanian Academy

Acad. Marius ANDRUH – President of „Chemical Sciences Section”
of the Romanian Academy

Emeritus Prof. Dr. Eng. Sorin ROSCA – President of Romanian
Society of Chemistry

Prof.Dr.Eng. Vladimir ROJANSCHI – President of Romanian
Environment Assoc. 1998

Felix STROE – President of Romanian Water Association

Emeritus Prof. Dr. Eng. Gheorghita JINESCU (Vice-President of
Romanian Society of Chemistry, Romania)

Scientific Committee

Chair: Ph.D. Chem. Luoana Florentina Pascu, INCD-ECOIND, Romania

Co-Chair: Ph.D. Eng. Carol Blaziu Lehr, INCD-ECOIND, Romania

Sustainable Environmental Technologies

Prof. Dr. Asher Brenner (Faculty of Engineering Sciences, Nen-Gurion University of the Negev, Israel)

SR Dr. Eng. Costel Bumbac (INCD-ECOIND, Romania)

Prof. Dr. Eng. Cristina Costache (University Politehnica Bucharest, Romania)

SR Dr. Eng. Gheorghe Batrinescu (INCD-ECOIND, Romania)

SR Chem. Cristiana Cosma (INCD-ECOIND, Romania)

Prof. Tim Grotenhuis (WUR, Olanda)

Honored Prof. Dr. Eng. Gheorghita Jinescu (University Politehnica Bucharest, Romania)

Dr. Mykola Kartel (CISC, Ukraine)

Dr. Paweł Krzeminski (NIVA, Norway)

Dr. Michela Langone (Trento University, Italy)

Acad. Dr. Tudor Lupascu (ICA, Moldova)

Prof. Dr. Ying Ma (Coimbra University, Portugal)

Prof. Dr. Eng. Ilieana Nistor (University of Bacau, Romania)

SR Dr. Eng. Ines Nitoi (INCD-ECOIND, Romania)

SR Dr. Eng. Ion-Viorel Patroescu (INCD-ECOIND, Romania)

Prof. Dr. Eng. Mircea Teodorescu (University Politehnica Bucharest, Romania)

Prof. Dr. Giuliano Tevi (Ecological University, Romania)

Dr. Eng. Valentin Vladut (INMA)

Pollution Assessment & Management System

Prof. Dr. Eng. Ioan Bica (UTC Bucharest, Romania)
SR Dr. Eng. Lucian Constantin (INCD-ECOIND, Romania)
SR Eng. Virgil Criste (INCD-ECOIND, Romania)
Dr. Biol. Stefania Gheorghe (INCD-ECOIND, Romania)
Prof. Dr. Tiago Natal da Luz (Coimbra University, Portugal)
SR Dr. Eng. Carol Lehr (INCD-ECOIND, Romania)
SR Biochem. Irina Lucaciu (INCD-ECOIND, Romania)
Prof. Dr. Rui S. Oliveira (Coimbra University, Portugal)
Dr. Robert Raschman (Dekonta, Czech Republic)
Prof. Dr. Eng. Geta Rasanoveanu (University of Bucharest, Romania)
Prof. Dr. Eng. Vladimir Rojanschi (Ecological University, Romania)
Prof. Dr. Daniel Scradeanu (University of Bucharest, Romania)
Prof. Dr. Jose Paulo Sousa (Coimbra University, Portugal)
SR Dr. Bogdan Adrian Stanescu (INCD-ECOIND, Romania)
SR Eng. Cristian Teodorescu (International Development, Norway)
Asst. Prof. Dr. Özlem Tunç Dede (Giresun University, Turkey)
SR Dr. Eng. Gabriela Geanina Vasile (INCD-ECOIND, Romania)
Dr. Caner Zanbak (Environmental Coordinator, Turkish Miners Association, Turkey)

Pollution Control and Monitoring

Prof. Dr. Irinel Adriana Badea (University of Bucharest, Romania)
SR Chem. Elena Bucur (INCD-ECOIND, Romania)
Dr. Marius Bumbac (Valahia University, Romania)
SR Chem. Liliana Cruceru (INCD-ECOIND, Romania)
Acad. Gheorghe Duca (ASRM, Moldova)
Prof. Margarita Filipova (Rousse University, Bulgaria)
SR Dr. Chem. Toma Galaon (INCD-ECOIND, Romania)
PhD Iryna Koval (Lviv Polytechnic National University, Ukraine)
Prof. PhD. Jean Louis Marty (Perpignan University, France)
Prof. dr. Eng. Aurelia Meghea (University Politehnica Bucharest, Romania)
Prof. Dr. Eng. Gheorghe Nechifor (University Politehnica Bucharest, Romania)
SR Dr. Biolog. Mihai Nita-Lazar (INCD-ECOIND, Romania)
SR Dr. Chem Luoana Florentina Pascu, (INCD-ECOIND, Romania)
SR Dr. Chem Jana Petre (INCD-ECOIND, Romania)
Prof. Dr. Eng. Gabriel-Lucian Radu (University Politehnica Bucharest, Romania)
Prof. Dr. Lucica Tofan (Ovidius University, Romania)
Prof. Dr. Chem. Luminita Vladescu (University of Bucharest, Romania)