

PRES'13

16TH CONFERENCE

**PROCESS INTEGRATION,
MODELLING AND OPTIMISATION
FOR ENERGY SAVING
AND POLLUTION REDUCTION**



AUTH

Department of Mechanical Engineering
Aristotle University of Thessaloniki



CERTH

Chemical Process and Energy Resources
Institute – CPERI
Centre for Research and Technology – Hellas



AIDIC

Italian Association
of Chemical Engineering



ARISTOTLE UNIVERSITY
OF THESSALONIKI



CERTH THE CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS



The Italian Association of Chemical Engineering

29 SEPTEMBER – 2 OCTOBER 2013
RHODES, GREECE

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PRES'13 WELCOME

PRES'13 International Scientific and Organisation Committees welcome all participants in the sixteenth event in the series of conferences in Rhodes, Greece. PRES conference series was initiated in 1998 in collaboration with the late Professor Zdeněk Burianec within the framework of the CHISA congresses and firmly put in the annual programme by joint conference PRES'99 with ESACPE 9 in collaboration with Hungarian colleagues in Budapest 1999. A strong partnership with the Italian Association of Chemical Engineering (AIDIC) that was developed over the last twelve years enabled the joint organization of the PRES event with the Italian Chemical Engineering Conference (ICheaP) and the publication of the conference proceedings in a dedicated volume of Chemical Engineering Transactions, covered by SCOPUS and ISI Thompson Reuters.

This year the conference is also co-organised by the Department of Mechanical Engineering of Aristotle University of Thessaloniki and the Chemical Process and Energy Resources Institute (CPERI) of the Centre for Research and Technology – Hellas (CERTH) both being leading organisations in Higher Education and Research in Greece.

The aim of the PRES conferences is to review the latest research developments and applications as well as preliminary results in new and emerging technologies in the fields of Process Integration, Mathematical Modelling and Optimisation for energy conservation, pollution reduction and related topics, leading to sustainable, environmentally friendly and cleaner production. The interaction of researchers in both industry and academia with industrial practitioners, which is particularly encouraged, adds a unique dimension into the conference.

The PRES'13 conference attracted 372 abstracts authored by more than 900 authors from 57 countries. Of these 213 papers were selected by the PRES'13 International Scientific Committee for inclusion in the final programme, which includes three Plenary lectures from leading scientists around the world, 15 Keynote lectures, 80 oral presentations and 135 poster presentations. All papers have undergone a thorough peer-reviewed procedure to ensure the highest possible technical quality assisted by more than 250 reviewers.

Special attention is given to the Poster Sessions. Presenters will be at the spotlight for more than four hours to present their scientific achievements, explain in detail their methodology and calculations, and receive plenty of time to convince the critical mind of the participants. A special Poster Selection Committee will scrutinize posters seeking the best one in terms of scientific excellence, clarity of presentation, and quality of the convincing arguments by

the presenter. The best poster is selected for the Zdeněk Burianec Memorial Award and invited to contribute a full research article in one of the PRES'13 special issues in leading scientific journals.

PRES'13 in Rhodes Greece offers a rich social programme to enhance the networking activities among the participants. The Welcome Reception Party on Sunday September 29th will set the stage for the first acquaintance of newcomers and the mingling of frequent and new participants of the PRES conferences and the commencement of the scientific debate. The daily coffee and lunch breaks are arranged to enable speakers to follow-up on questions and discussions initiated during the sessions. The Conference Gala dinner on the evening of October 1st is planned to be the main event for the bonding of the participants in what is called the PRES family. During the dinner, the Best Poster Award recipients are going to be decorated by the Selection Committee and the plans for future meetings of the PRES family will be unveiled.

Usually conference locations are selected carefully for enriched cultural experiences. Rhodes is a place that offers exquisite landscapes, excellent climate especially at the beginning of autumn, and an unprecedented record of history. Conference participants are encouraged to explore the ancient and medieval past of the island, the unique beaches with the true blue colour, and the unique ecosystem in the South-Eastern tip of Europe.

The PRES conference greatly values the contribution made by the session chairmen of the International Scientific Committee. The Organising Committee has faced the hard job of managing the participation of delegates from all over the world. The contribution of AIDIC in the preparation of the conference proceedings as a special volume of Chemical Engineering Transactions is gratefully appreciated. PRES'13 greatly appreciates the work performed by the CPERI/CERTH and especially the personnel of the Process Systems Design and Implementation Laboratory in all stages of the Conference preparation.

Jiří Jaromír Klemeš and Panos Seferlis
PRES '13 Scientific Committee Presidents

Jiří Drahoš, Ferenc Friedler, Sauro Pierucci and Petr Stehlík
PRES'13 Scientific Committee Vice-Presidents

ABOUT PRES SERIES

PRES'13 is the sixteenth in the series. It was initiated by the late Professor Zdeněk Burianec in the framework of CHISA congresses. The events in the series are as follows:

EVENT	YEAR	PLACE	COUNTRY
1	1998	Prague	Czech Republic
2	1999	Budapest	Hungary
3	2000	Prague	Czech Republic
4	2001	Florence	Italy
5	2002	Prague	Czech Republic
6	2003	Hamilton, Ontario	Canada
7	2004	Prague	Czech Republic
8	2005	Giardini Naxos	Italy
9	2006	Prague	Czech Republic
10	2007	Ischia, Naples	Italy
11	2008	Prague	Czech Republic
12	2009	Rome	Italy
13	2010	Prague	Czech Republic
14	2011	Florence	Italy
15	2012	Prague	Czech Republic
16	2013	Rhodes	Greece

TOPICS AND CONFERENCE FORMAT

The aim of the PRES conference is to review the latest development and applications of process integration for energy conservation, pollution reduction and related topics. Industrial experience of the application of any available method is also welcome.

TOPICS

Process integration for sustainable development
Energy saving technology
CO ₂ minimisation and mitigation
Combined heat & power, Combined cycles
Heat exchangers as equipment and integrated items
Integration of renewables, biomass and energy conversion technologies
Integrated and multifunctional operations
Operational research and supply chain management
Pulp & paper
Clean technologies - Low emissions technologies
Sustainable processing and production
Waste minimisation, processing and management
Thermal treatment of waste including waste to energy
Batch processes
Dynamic, flexible and sustainable plant operation
Industrial & experimental studies
Industrial application & optimal design
e-learning, e-teaching and e-knowledge
CFD and numerical heat transfer
Sustainable biofuel production

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L. Savulescu	Natural Resources Canada	CA
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S. Pistikopoulos	Imperial College, London	UK
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PLENARY SPEAKERS

TRULS GUNDERSEN

Norwegian University of Science and Technology, Trondheim, Norway

Process Integration in Sub-ambient Processes



Sub-ambient processes differ from above ambient plants in a number of ways. Refrigeration represents an expensive cold utility produced by compression and expansion (i.e. work or exergy), the distinction between process streams and utilities is vague since streams are temporarily acting as utilities, and does not work as an economic trade-off parameter, to mention a few characteristics. In fact, the path between supply and target state for process streams is not defined, rather it is a resulting part of the optimal design and the process Pinch tends to disappear. This talk illustrates how these challenges can be addressed by a combination of Pinch Analysis, Exergy considerations and Mathematical Optimisation. Applications will cover cryogenic processes for air separation (ASUs) and liquefaction of natural gas to produce LNG.

Truls Gundersen is a Professor of Energy and Process Engineering at the Norwegian University of Science and Technology (NTNU) that he joined in 1996. He received a PhD in Chemical Engineering from the same university in 1982 and spent 12 years in industry with Norsk Hydro before joining academia in 1993. His research interests include Process Integration and Process Synthesis with special emphasis on the use of Thermodynamics in the design phase. He is also involved in CCS as the NTNU coordinator of BIGCCS, a 75 million USD program that runs for 8 years. He was elected member of the Norwegian Academy of Technological Sciences in 1991.

XIAO FENG

China University of Petroleum, Beijing, China

Synthesis of Water Networks with Water Loss and Gain via an Extended Pinch Analysis Technique



In recent years, water scarcity and stringent environmental protection legislation motivate the process industries to emphasis on wastewater minimization in their daily operations. Up to date, water pinch analysis is commonly accepted as promising tools on the synthesis of water networks in process industries. In industrial practice, there may be water loss or gain for certain water-using processes. For instance, the make-up to cooling towers accounted for evaporation and leakage is typically fixed flow rate which is lost. Besides, water may leave with the product and it is another example of water loss. On the other hand, the dewatering process may generate certain amount of water as an example of water gain. In this paper, the previous works on the synthesis of water network considering water loss/gain are reviewed thoroughly. The approaches can be divided into two board categories: Pinch analysis and Mathematical programming. The recently developed approach for targeting and design of water network with water loss/gain is presented in detail. The revised limiting water profile is introduced for the flow rate targeting of a water-using process with water loss/gain. The Process-based Graphical Approach (PGA) is presented for the simultaneous targeting and design of water networks. Via the PGA procedure, in addition to locate the minimum freshwater and wastewater flow rate targets, the water network that corresponds to the minimum flow rate targets is also identified simultaneously. The PGA procedure is illustrated via solving a literature example. In addition, the generalised procedure for the presented PGA is summarised in a diagram. Finally, comparison is made between it and those approaches in literatures.

Xiao Feng is a professor of Chemical Engineering at China University of Petroleum – Beijing, which she joined in 2009 after working more than 20 years in Xi'an Jiaotong University, China. Her research interests lie in process integration and include energy, water and hydrogen system integration, by graphical method and mathematical programming. Prof. Feng is an author on over 200 archival publications and two books and the Vice-Chair of the Thermodynamics and Engineering Application Committee, China Energy Research Society, Standing Director of Chinese Chemical Education Society, and Director of Process System Engineering Society, Chinese System Engineering Society.

LORENZ T. BIEGLER

Carnegie Mellon University, Pittsburgh, USA

Optimisation-based Process Synthesis for Sustainable Power Generation



Novel power generation processes are challenged by needs for CO₂ minimization, higher energy efficiency and integration of superior processing technologies. These challenges also require the development of more effective models and strategies for large-scale process optimisation. This talk considers optimisation tools and formulations for process synthesis that highlights reduced order modeling, structural changes via complementarity conditions and fast optimisation algorithms. The combined approach is demonstrated on the process synthesis of a novel oxy-combustion process.

Lorenz T. (Larry) Biegler is the Bayer University Professor of Chemical Engineering at Carnegie Mellon University, which he joined after receiving his PhD from the University of Wisconsin in 1981. His research interests lie in computer aided process engineering (CAPE) and include flowsheet optimisation, optimisation of systems of differential and algebraic equations, reactor network synthesis and algorithms for constrained, nonlinear process control. Prof. Biegler is an author on over 300 archival publications and two books and has been an institute fellow at the National Energy Technology Lab, a Chang Jiang scholar at Zhejiang University, a Fulbright Fellow at the University of Heidelberg, and the Hougen Visiting Professorship at the University of Wisconsin.

SUPPORTED BY



ACKNOWLEDGEMENTS

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Charalambos Tziogas	AUTH	GR
Christina Tzourelis	CERTH/TTP	GR
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Stavroula Vakla	CERTH/CPERI/PSDI	GR
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Fotini Ziogou	CERTH/CPERI/PSDI	GR

CONFERENCE ROOM				
TIME	ELAFOS (Main Lobby)	CLIO (3 rd Floor)	OURANIA (4 th Floor)	ELAFINA (10 th Floor)
29	SUNDAY, SEPTEMBER 29th			
17:00	REGISTRATION (Main Lobby)			
19:30	WELCOME RECEPTION PARTY (Swimming Pool Area – 11 th Floor)			
30	MONDAY, SEPTEMBER 30th			
08:00	REGISTRATION (Main Lobby)			
09:00	OPENING SESSION			
09:30	PLENARY SESSION I			
10:30	COFFEE BREAK (Main Lobby)			
11:00	SESSION 1.1 Process Integration for Sustainable Development	SESSION 2.1 Energy Saving Technology	SESSION 3.1 Batch, Dynamic, Flexible and Sustainable Plant Operation	
13:00	LUNCH (Hotel Restaurant – 10 th Floor)			
13:45				POSTER SESSION A Best Poster Contest
14:30	SESSION 1.2 Process Integration for Sustainable Development	SESSION 2.2 Energy Saving Technology	SESSION 3.2 Compact Multifuel-Energy to Hydrogen Converter – COMETHY	
16:10	COFFEE BREAK (Main Lobby)			
16:40	SESSION 1.3 Process Integration for Sustainable Development	SESSION 2.3 Operational Research, Supply Chain Management and Education	SESSION 3.3 Industrial and Experimental Studies	
01	TUESDAY, OCTOBER 1st			
08:30	SESSION 1.4 Sustainable Biofuel Production	SESSION 2.4 CO ₂ Minimisation and Mitigation	SESSION 3.4 New Horizons in Energy	
10:30	COFFEE BREAK (Main Lobby)			

CONFERENCE ROOM				
TIME	ELAFOS (Main Lobby)	CLIO (3 rd Floor)	OURANIA (4 th Floor)	ELAFINA (10 th Floor)
01	TUESDAY, OCTOBER 1st			
11:00	PLENARY SESSION II			
12:00	SESSION 1.5 Sustainable Biofuel Production	SESSION 2.5 CO ₂ Minimisation and Mitigation	SESSION 3.5 New Horizons in Heat	
13:00	LUNCH (Hotel Restaurant – 10 th Floor)			
13:45				POSTER SESSION B Best Poster Contest
14:30	SESSION 1.6 Industrial Application & Optimisation Design	SESSION 2.6 Thermal Treatment of Waste Including Waste to Energy	SESSION 3.6 New Horizons in Modelling Techniques	
16:10	COFFEE BREAK (Main Lobby)			
16:40	SESSION 1.7 Industrial Application & Optimisation Design	SESSION 2.7 Heat Exchangers as Equipment and Integrated Items – CFD		
20:00	CONFERENCE GALA DINNER (Swimming Pool Area – 11 th Floor)			
02	WEDNESDAY, OCTOBER 2nd			
08:30	SESSION 1.8 Clean Technologies – Low Emissions Technologies	SESSION 2.8 Integration of Renewables, Biomass, & Energy Conversion Technology		
10:30	COFFEE BREAK (Main Lobby)			
11:00	PLENARY SESSION III			
12:00	SESSION 1.9 Waste Minimisation, Processing and Management	SESSION 2.9 Integration of Renewables, Biomass, & Energy Conversion Technology		
13:00	LUNCH (Hotel Restaurant – 10 th Floor)			
14:00	CONFERENCE CLOSING			



PROGRAMME

ELAFOS Conference Room
(Main Lobby)

29 SUNDAY, SEPTEMBER 29th

-
- 17:00 Registration (Main Lobby)
-
- 19:30 Welcome Reception (Swimming Pool Area – 11th Floor)
-

30 MONDAY, SEPTEMBER 30th

-
- 08:00 Registration (Main Lobby)
-
- 09:00 Opening Session
PRES CHAIRS: **Prof. Jiří J. Klemeš, Prof. Panos Seferlis**
PRES CO-CHAIRS: **Prof. Jiří Drahoš, Prof. Ferenc Friedler, Prof. Sauro Pierucci, Prof. Petr Stehlík**
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Prof. Eleftherios Iakovou, Chair Department of Mechanical Engineering, A.U.Th.
Prof. Jiří Drahoš, Past President of European Federation of Chemical Engineering and President of Academy of Sciences Czech Republic
Prof. Panos Seferlis & Prof. Jiří J. Klemeš: PRES'13 Opening Presentation
-
- 09:30 **PLENARY LECTURE I**
CHAIRS: **Prof. Jiří J. Klemeš, Prof. Sauro Pierucci**
PROCESS INTEGRATION IN SUB-AMBIENT PROCESSES
Gundersen T.
-
- 10:30 COFFEE BREAK (Main Lobby)
-
- SESSION 1.1
PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT
CHAIRS: **Prof. Jiří J. Klemeš, Prof. Sauro Pierucci**
-
- 11:00 **KEYNOTE LECTURE**
COGENERATION IMPROVEMENT BASED ON STEAM CASCADE ANALYSIS
Sun L., Doyle S., Smith R.
-

- 11:40 Optimisation of Hybrid Renewable Power Generation Flowsheets Using Generic Structural and Temporal Models
Giaouris D., Papadopoulos A.I., Ziogou C., Ipsakis D., Seferlis P., Papadopoulou S., Voutetakis S., Elmasides C.
- 12:00 A Two-step Solution Strategy for the Synthesis of Pinched and Threshold Heat-integrated Process Water Networks
Ibric N., Ahmetović E., Kravanja Z.
- 12:20 Water Allocation Network Synthesis Involving Reliability Analysis
Du J., Chen J., Li J.L., Meng Q.W.
- 12:40 Development of Innovative Methanol Synthesis Process Based on Self-heat Recuperation
Kansha Y., Ishizuka M., Tsutsumi A.
- 13:00 LUNCH (Hotel Restaurant – 10th floor)
- 13:45 POSTER SESSION – Best Poster Contest (Elafina Conference Room – 10th floor)

SESSION 1.2

PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT

CHAIRS: **Prof. Ferenc Friedler, Prof. Jiří Drahoš**

- 14:30 **KEYNOTE LECTURE**
TOTAL SITE HEAT INTEGRATION WITH SEASONAL ENERGY AVAILABILITY
Liew P.Y., Wan Alwi S.R., Klemeš J.J., Varbanov P.S., Manan Z.A.
- 15:10 Refinery Hydrogen Network Management with Key Factor Analysis
Deng C., Li W., Feng X.
- 15:30 The Role of Process Synthesis in the Systematic Design of Energy Efficient Fossil Fuel Power Plants with CO₂ Capture
Anantharaman R., Jordal K., Berstad D., Gundersen T.
- 15:50 Heat Exchanger Network Synthesis for Batch Processes by Involving Heat Storages
Du J., Yang P., Li J.L., Liu L.L., Meng Q.W.
- 16:10 COFFEE BREAK (Main Lobby)

SESSION 1.3

PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT

CHAIRS: **Prof. Kazuo Matsuda, Prof. Xiao Feng**

- 16:40 **KEYNOTE LECTURE**
OPTIMISATION OF PUMPED-HYDRO STORAGE SYSTEM FOR HYBRID POWER SYSTEM USING POWER PINCH ANALYSIS
Mohammad Rozali N.E., Wan Alwi S.R., Manan Z.A., Klemeš J.J., Hassan M.Y.

- 17:20 Heat Transfer Area Targeting for Heat Recovery on Total Site
Boldyryev S., Varbanov P.S., Nemet A., Kapustenko P., Klemeš J.J.
- 17:40 Enlarging the Product Portfolio of a Kraft Pulp Mill via Hemicellulose and Lignin Separation – Process Integration Studies in a Case Mill
Lundberg V., Bood J., Nilsson L., Mahmoudkhani M., Axelsson E., Berntsson T.
- 18:00 Multi-objective Regional Total Site Integration
Čuček L., Varbanov P.S., Klemeš J.J., Kravanja Z.
- 18:20 Heat Integration Across Plants Considering Distance Factor
Wang Y., Wang W., Feng X.

01 **TUESDAY, OCTOBER 1st**

SESSION 1.4

SUSTAINABLE BIOFUEL PRODUCTION

CHAIRS: **Prof. Eugeny Kenig, Dr Elvis Ahmetović**

- 8:30 **KEYNOTE LECTURE**
INTEGRATION OF BIOHYDROGEN PRODUCTION WITH HEAT AND POWER GENERATION FROM BIOMASS RESIDUES
Wukovits W., Drljo A., Hilby E., Friedl A.
- 9:10 Optimal Design of Solar Assisted Hydrothermal Gasification for Microalgae to Synthetic Natural Gas Conversion
Mian A., Ensinas A.AV., Ambrosetti G., Marechal F.
- 9:30 Glycerin Revalorization Using Anaerobic Digestion of Organic Waste
Rafecas Rahuet A., Plešu V., Bonet Ruiz J., Bonet Ruiz A., Llorens Llacuna J.
- 9:50 Bioethanol from Brewer's Spent Grains: Acid Pretreatment Optimisation
Caetano N.S., Moura R.F., Meireles S., Mendes A.M., Mata T.M.
- 10:10 Sustainable Production of Bioparaffins
Hancsók J., Eller Z., Pölcsmann G., Varga Z.
- 10:30 COFFEE BREAK (Main Lobby)
- 11:00 **PLENARY LECTURE II**
CHAIRS: **Prof. Truls Gundersen, Dr Hon Loong Lam**
SYNTHESIS OF WATER NETWORKS WITH WATER LOSS AND GAIN VIA AN EXTENDED PINCH ANALYSIS TECHNIQUE
Feng X., Deng C.

SESSION 1.5

SUSTAINABLE BIOFUEL PRODUCTION

CHAIRS: **Prof. Anton Friedl, Dr Tibor Chován**

- 12:00 Process Simulation Tools for the Assessment of Biorefinery Processes Intensification by Ultrasounds Technology
García A., González Alriols M., Wukovits W., Friedl A., Labidi J.

- 12:20 Energy Integration of the Gas-cooled/water-cooled Fixed-bed Reactor Network for Methanol Synthesis
Manenti F., Leon Garzon A.R., Bozzano G.
- 12:40 Evaluation of Sorghum Biorefinery Concepts for Energy and Bioethanol Production
Weinwurm F., Drljo A., Theuretzbacher F., Bauer A., Friedl A.
- 13:00 LUNCH (Hotel Restaurant – 10th floor)
- 13:45 POSTER SESSION – Best Poster Contest (Elafina Conference Room – 10th floor)

SESSION 1.6

INDUSTRIAL APPLICATION & OPTIMISATION DESIGN

CHAIRS: **Prof. Neven Duić, Prof. Truls Gundersen**

- 14:30 **KEYNOTE LECTURE**
LIFE SPAN PRODUCTION PLANT OPTIMISATION UNDER VARYING ECONOMIC CONDITIONS
Nemet A., **Klemeš J.J.**, **Kravanja Z.**
- 15:10 Development of Modified Plug-flow Furnace Model for Identification of Burner Thermal Behaviour
Jegla Z.
- 15:30 Dynamic Multi-objective Synthesis of Companies' Supply-networks
Kiraly A., **Pahor B.**, **Čuček L.**, **Kravanja Z.**
- 15:50 Process Intensification Alternatives in the Dme Production
Kiss A., **Suszwalak D.**, **Ignat R.**
- 16:10 COFFEE BREAK (Main Lobby)

SESSION 1.7

INDUSTRIAL APPLICATION & OPTIMISATION DESIGN

CHAIRS: **Prof. Chakib Bouallou, Prof. Nataša Markovska**

- 16:40 **KEYNOTE LECTURE**
A DERIVATIVE APPROACH TO MINIMISING TOTAL COST IN HEAT EXCHANGER NETWORKS THROUGH OPTIMAL AREA ALLOCATION
Walmsley T.G., **Walmsley M.R.W.**, **Morrison A.S.**, **Atkins M.J.**, **Neale J.R.**
- 17:20 Generalized Framework for the Optimal Design of Solvent-based Post-combustion CO₂ Capture Flowsheets
Damartzis T., **Papadopoulos A.I.**, **Seferlis P.**
- 17:40 Integration of Solar Heating Into Heat Recovery Loops Using Constant and Variable Temperature Storage
Walmsley M.R.W., **Walmsley T.G.**, **Atkins M.J.**, **Neale J.R.**

- 18:00 A New Batch Extractive Distillation Operational Policy for Methanol Recovery
Hegely L., **Lang P.**, **Kovacs G.**
- 18:20 A New Solar Reactor Aperture Mechanism Coupled with Heat Exchanger
Menon A. K., **Farid A.**, **Ozalp N.**
- 20:00 CONFERENCE GALA DINNER (Swimming Pool – 11th Floor)

02 WEDNESDAY, OCTOBER 2nd

SESSION 1.8

CLEAN TECHNOLOGIES – LOW EMISSIONS TECHNOLOGIES

CHAIRS: **Dr Jiří Hájek, Prof. Vatcheslav Kafarov**

- 8:30 **KEYNOTE LECTURE**
WASTE TO ENERGY FOR SMALL CITIES: ECONOMICS VERSUS CARBON FOOTPRINT
Ng W.P.Q., **Varbanov P.S.**, **Klemeš J.J.**, **Hegyhati M.**, **Bertók B.**, **Heckl I.**, **Lam H.L.**
- 9:10 Flue Gas Cleaning by High Energy Electron Beam – Enhancement Effects Due to Water Droplets Generation
Gogulancea V., **Lavric V.**
- 9:30 CO₂ Emission Reduction in the Cement Industry
Mikulčić H., **Vujanović M.**, **Markovska N.**, **Filkoski R.**, **Ban M.**, **Duić N.**
- 9:50 Permeable Adsorbing Barrier for Groundwater Protection from Single-compounds and Multicomponent Contamination by Chlorinated Organic Compounds
Bortone I., **Di Nardo A.**, **Di Natale M.**, **Erto A.**, **Musmarra D.**
- 10:10 Techno-economic Assessment of Polymeric, Ceramic and Metallic Membranes Integration in an Advanced Igcc Process for H₂ Production and CO₂ Capture
Koutsonikolas D., **Kaldis S.P.**, **Pantoleonos G.T.**, **Zaspalis V.T.**, **Sakellaropoulos G.P.**
- 10:30 COFFEE BREAK (Main Lobby)
- 11:00 **PLENARY LECTURE III**
CHAIRS: **Prof. Panos Seferlis, Dr Petar Varbanov**
OPTIMISATION-BASED PROCESS SYNTHESIS FOR SUSTAINABLE POWER GENERATION
Dowling A. W., **Biegler L.T.**

SESSION 1.9

WASTE MINIMISATION, PROCESSING AND MANAGEMENT

CHAIRS: **Dr Zdeněk Jegla, Dr Hon Loong Lam**

-
- 12:00 **KEYNOTE LECTURE**
THE LOGISTIC MODEL FOR DECISION MAKING IN WASTE MANAGEMENT
Šomplák R., Procházka V., Pavlas M., Popela P.
-
- 12:20 Nimo/hbeta as Catalysts with Dual Functions Beneficial to Waste Tyre Pyrolysis
Piyawongpinyo Y., Jitkarnka S.
-
- 12:40 Optimal Swro Network Synthesis and Design Assessment with Water Quality Insights
Alnouri S., Linke P.
-
- 13:00 LUNCH (Hotel Restaurant – 10th floor)
-
- 14:00 CONFERENCE CLOSING
-

-
- 12:40 Total Site Integration for Coke Oven Plant
Ulyev L., Kapustenko P., Vasilyev M., Boldyryev S.
-
- 13:00 LUNCH (Hotel Restaurant – 10th floor)
-
- 13:45 POSTER SESSION – Best Poster Contest (Elafina Conference Room – 10th floor)
-

SESSION 2.2

ENERGY SAVING TECHNOLOGY

CHAIRS: **Prof. Martin Picón Núñez, Dr Lidjia Čuček**

-
- 14:30 **KEYNOTE LECTURE**
A MATHEMATICAL PROGRAMMING APPROACH TO THE OPTIMAL LONG-TERM NATIONAL ENERGY PLANNING
Koltsaklis N.E., Dagoumas A.S., Kopanos G.M., Pistikopoulos E.N., Georgiadis M.C.
-
- 15:10 Effect of Different Gas Turbine on Integrated Gasification Poly-generation Plant with Methanol and Power Generation
Chen P.C., Chiu H.M., Chyou Y.P.
-
- 15:30 Cost-effective Design of Energy Efficient Four-product Dividing Wall Columns
Dejanović I., Halvorsen I., Skogestad S., Jansen H., Olujić Z.
-
- 15:50 Energy Intensive Process in Professional Laundry Care: Up-to-date Approach
Máša V., Bobak P., Stehlík P., Kuba P.
-
- 16:10 COFFEE BREAK (Main Lobby)
-

SESSION 2.3

OPERATIONAL RESEARCH, SUPPLY CHAIN MANAGEMENT

CHAIRS: **Prof. Nasrin Ozalp, Dr Monika Bakošová**

-
- 16:40 **KEYNOTE LECTURE**
BIOMASS DEMAND-RESOURCES VALUE TARGETING
Lam H.L., Lim C.H.
-
- 17:20 Optimising the Operation of a District Heating System
Olofsson D., Bellqvist D., Karlsson J., Johansson M.
-
- 17:40 A Location-routing Approach to Optimal Sludge Management
Solisio C., Dovi V.
-
- 18:00 Note on the Development of Sustainable Supply Chain Strategy
Deutsch N., Dravavolgyi T., Rideg A.
-
- 18:20 Intensifying Air Separation Units
Manenti F., Rossi F., Croce G., Grottoli M.G., Altavilla M.
-

PROGRAMME **CLIO Conference Room**
(3rd Floor)

30 MONDAY, SEPTEMBER 30th

SESSION 2.1

ENERGY SAVING TECHNOLOGY

CHAIRS: **Prof. Panos Seferlis, Prof. Petr Stehlík**

-
- 11:00 **KEYNOTE LECTURE**
LOW HEAT POWER GENERATION SYSTEM
Matsuda K.
-
- 11:40 Exploring the Near-optimal Solution Space for the Synthesis of Distributed Energy Supply Systems
Voll P., Hennen M., Klaffke C., Lampe M., Bardow A.
-
- 12:00 Active Magnetic Regenerative Heat Circulator for Energy Saving in Thermal Process
Kotani Y., Kansha Y., Tsutsumi A.
-
- 12:20 Theoretical Potential to Convert Excess Heat Into Electricity in the Finnish Industry
Jarvinen T., Holmberg H., Ahtila P.
-

01 TUESDAY, OCTOBER 1ND

SESSION 2.4

CO₂ MINIMISATION AND MITIGATION

CHAIRS: **Prof. Sharifah Rafidah Wan Alwi, Prof. Simon Harvey**

- 08:30 **KEYNOTE LECTURE**
A DECISION SUPPORT FRAMEWORK FOR CAPTURING THE IMPACT OF ENERGY SAVINGS AND POLLUTION LEGISLATION ON SUPPLY CHAIN NETWORK DESIGN
Mallidis I., Vlachos D., Iakovou E.
- 09:10 Kinetics Study and Simulation of CO₂ Absorption Into Mixed Aqueous Solutions of Methyl-diethanolamine and Diethanolamine
Toro-Molina C., Bouallou C.
- 09:30 Methodological Framework for Supply Chain Carbon Footprint Management
Aivazidou E., Iakovou E., Vlachos D., Keramydas C.
- 09:50 Energy Performance of CO₂ Capture Processes: Interaction Between Process Design and Solvent
Neveux T., Le Moullec Y., Corriou J.P., Favre E.
- 10:10 Hydrodynamic-analogy-based Modelling of CO₂ Capture by Aqueous Monoethanolamine
Yazgi M., Kenig E.
- 10:30 COFFEE BREAK (Main Lobby)
- 11:00 **PLENARY LECTURE II**
(ELAFOS Conference Room)
- SESSION 2.5
- CO₂ MINIMISATION AND MITIGATION**
- CHAIRS: **Prof. Lorenz T. Biegler, Prof. Cheng-Liang Chen**
- 12:00 Greek Lignite-fired Power Plants with CO₂ Capture for the Electricity Generation Sector
Kakaras E., Koumanakos A., Doukelis A.
- 12:20 Integrated Low-temperature CO₂ Capture from IGCC Power Plant by Partial Condensation and Separation of Syngas
Berstad D., Anantharaman R., Neks P.
- 12:40 Assessment of Carbon Capture Options for Super-critical Coal-based Power Plants
Cormos C.C., Cormos A.M., Agachi P.S.
- 13:00 LUNCH (Hotel Restaurant – 10th floor)
- 13:45 POSTER SESSION – Best Poster Contest (Elafina Conference Room – 10th floor)

SESSION 2.6

THERMAL TREATMENT OF WASTE INCLUDING WASTE TO ENERGY

CHAIRS: **Prof. David Kukulka, Prof. Thore Bertsson**

- 14:30 **KEYNOTE LECTURE**
SIMULATION SOFTWARE FOR MASS AND ENERGY BALANCE OF PROCESS AND ENERGY SYSTEMS
Skydánek L.
- 15:10 Combining Multi-parametric Programming and Nmpc for the Efficient Operation of a Pem Fuel Cell
Ziogou C., Georgiadis M.C., Pistikopoulos E.N., Papadopoulou S., Voutetakis S.
- 15:30 Co-Pyrolysis of Biomass and Plastics Waste: a Modelling Approach
Oyedun A.O., Gebreegziabher T., Hui C.W.
- 15:50 Solar Energy and Biowaste Conversion Into H₂ on CuO_x/TiO₂ Nanocomposites
Ampelli C., Passalacqua R., Genovese C., Perathoner S., Centi G., Montini T., Gombac V., Fornasiero P.
- 16:10 COFFEE BREAK (Main Lobby)

SESSION 2.7

HEAT EXCHANGERS AS EQUIPMENT AND INTEGRATED ITEMS

CHAIRS: **Prof. Michael R.W. Walmsley, Prof. Petro Kapustenko**

- 16:40 **KEYNOTE LECTURE**
EVALUATION OF A 1EHT ENHANCED HEAT TRANSFER TUBE BUNDLE FOR PROCESSES INVOLVING BOILING
Kukulka D., Smith R.
- 17:20 Thermal Analysis of Unconventional Process Condenser Using Conventional Software
Pačíska T., Jegla Z., Kilkovský B., Reppich M., Turek V.
- 17:40 Dynamic Data Reconciliation in a Hot-oil Heat Exchanger for Validating Energy Consumption
Singhmaneeskulchai P., Siemanond K.
- 18:00 The Modified Analogy of Heat and Momentum Transfers for Turbulent Flows in Channels of Plate Heat Exchangers
Arsenyeva O., Tovazhnyanskii L.L., Kapustenko P., Demirskyy O.
- 18:20 CFD Investigation of Heat Transfer and Flow Patterns in Tube Side Laminar Flow and the Potential for Enhancement
Osley W.G., Droegemueller P., Ellerby P.
- 18:40 Numerical Analysis of Plain Fin-and-oval-tube Heat Exchanger with Different Inlet Angles
Chu W., Yu P., Ma T., Zeng M., Wang Q.-W.
- 20:00 CONFERENCE GALA DINNER (Swimming Pool Area – 11th Floor)

02 WEDNESDAY, OCTOBER 2ND

SESSION 2.8

INTEGRATION OF RENEWABLES, BIOMASS AND ENERGY

CHAIRS: **Prof. Zainuddin Abdul Manan, Prof. Peter Lang**

- 08:30 **KEYNOTE LECTURE**
A PROCESS INTEGRATION TECHNIQUE FOR TARGETING AND DESIGN OF POWER NETWORKS
Chen C.L., Lai C.T., Lee J.Y.
- 09:10 Renewable Energy Balancing with Thermal Grid Support
Zwaenepoel B., Vansteenbrugge J., Vandoorn T., Van Eetvelde G., Vandeveldde L.
- 09:30 Process Integration of Lignocellulosic Biomass Pre-treatment in the Thermo-chemical Production of F-t Fuels. Centralised Versus Decentralised Scenarios
Peduzzi E., Boissonnet G., Haarlemmer G., Setier P.A., Marechal F.
- 09:50 Influence of Different Pretreatment Methods on Biomass Gasification and Production of Ft Crude Integrated with a Pulp and Paper Mill
Isaksson J., Asblad A., Berntsson T.
- 10:10 Techno-economic Energy Model for Low Carbon Business Parks
Timmerman J., Deckmyn C., Vandeveldde L., Van Eetvelde G.
- 10:30 COFFEE BREAK (Main Lobby)
- 11:00 **PLENARY LECTURE III**
(ELAFOS Conference Room)
- SESSION 2.9
INTEGRATION OF RENEWABLES, BIOMASS AND ENERGY
CHAIRS: **Dr Alexandra Bonet-Ruiz, Prof. Janos Abonyi**
- 12:00 Study of Different Bio-processing Pathways in a Lignocellulosic Biorefinery by Process Simulation
García A., Egüés I., Sánchez C., Barta Z., Labidi J.
- 12:20 Thermo-economic Optimisation of Integrated 1st and 2nd Generation Sugarcane Ethanol Plant
Ensinas A.V., Codina V., Marechal F., Albarelli J., Silva M.A.
- 12:40 Modelling the Fluid Phase Behaviour of Multifunctional Alkanolamines and Carbon Dioxide
Chremos A., Forte E., Papaioannou V., Galindo A., Jackson G., Adjiman C.
- 13:00 LUNCH (Hotel Restaurant – 10th floor)
- 14:00 CONFERENCE CLOSING

PROGRAMME

OURANIA Conference Room (4th Floor)

30 MONDAY, SEPTEMBER 30TH

SESSION 3.1

BATCH, DYNAMIC, FLEXIBLE AND SUSTAINABLE PLANT OPERATION

CHAIRS: **Dr Petar Varbanov, Prof. Zdravko Kravanja**

- 11:00 **KEYNOTE LECTURE**
ROBUST CONSTRAINED MODEL PREDICTIVE CONTROL OF HEAT EXCHANGER NETWORK
Bakošová M., Oravec J.
- 11:40 Operational Flexibility in Pulp Mill Steam Production at Off-design Heat Loads
Svensson E., Berntsson T.
- 12:00 Comparison of Conventional and Middle Vessel Batch Reactive Distillation Column: Application of Hydrolysis of Methyl Lactate to Lactic Acid
Edreder E.A., Mujtaba I.M., Emtir M.
- 12:20 Historical Process Data Based Energy Monitoring - Model Based Time-series Segmentation to Determine Target Values
Abonyi J., Kulcsar T., Balaton M., Nagy L.
- 12:40 Optimisation of Pid Controller Parameters in the Case of Batch Styrene Suspension Polymerization
Paláu G.R., Lavric V.
- 13:00 LUNCH (Hotel Restaurant – 10th floor)
- 13:45 POSTER SESSION – Best Poster Contest (Elafina Conf. Room – 10th floor)

SESSION 3.2

COMPACT MULTIFUEL-ENERGY TO HYDROGEN CONVERTER (COMETHY)

CHAIRS: **Dr Paris Voutetakis, Dr Martin Gough**

- 14:30 Development of a Solar-powered, Fuel-flexible Compact Steam Reformer: the Comethy Project
Giaconia A., Turchetti L., Monteleone G., Morico B., Iaquaniello G., Shabtai K., Sheintuch M., Boettge D., Adler J., Palma V., Voutetakis S., Lemonidou A.A., Annesini M.C., den Exter M., Balzer H.

-
- 14:50 Time-on-stream Stability of New Catalysts for Low-temperature Steam Reforming of Biogas
Turchetti L., Monteleone G., Giaconia A., Sau S., Palma V., Castaldo F., Lemonidou A.A., Angeli S.D.
-
- 15:10 Low Temperature Methane Steam Reforming: Catalytic Activity and Coke Deposition Study
Angeli S.D., Monteleone G., Giaconia A., Lemonidou A.A.
-
- 15:30 Steam Reforming of Ethanol to H₂ over Bimetallic Catalysts: Crucial Roles of CeO₂, Steam-to-Carbon Ratio and Space Velocity
Palma V., Castaldo F., Ciambelli P., Iaquaniello G.
-
- 15:50 Modeling and Simulation of a Membrane Reactor for the Low Temperature Methane Steam Reforming
Kyriakides A.S., Ipsakis D., **Voutetakis S.**, Papadopoulou S., Seferlis P.
-
- 16:10 COFFEE BREAK (Main Lobby)
-

SESSION 3.3

INDUSTRIAL & EXPERIMENTAL STUDIES

CHAIRS: **Prof. Yasuki Kansha, Prof. Jalel Labidi**

- 16:40 **KEYNOTE LECTURE**
THERMO-HYDRAULIC DESIGN OF SOLAR COLLECTOR NETWORKS FOR INDUSTRIAL APPLICATIONS
Picón-Núñez M., Martínez-Rodríguez G., Fuentes-Silva A.L.
-
- 17:20 Research About the Method of Synthetizing N,n-dimethyl-1,3-propanediamine Continuously
Meng Q.W., Deng C., Li Y., Du J.
-
- 17:40 Kinetic Study of the Methyl Acetate and Isobutanol Transesterification Catalysed by the Dissociation of Sodium Hydrogensulfate in Alcohol Media
Vega Rodríguez A., Plešu V., Calvet Tarragona A., Bonet Ruiz J., **Bonet Ruiz A.**, Llorens Llacuna J.
-
- 18:00 Energy Consumption Versus Antioxidant Activity of Pressurized Fluid Extracts from Pfaffia Glomerata Roots
Santos D., Vardanega R., Albarelli J., Ensinas A.V., Marechal F., Meireles M.A.
-
- 18:20 Power Grid Simulation Model for Long Term Operation Planning
Zábojník J., Dvořák M.
-
- 18:40 Online Monitoring of TOC Contaminations in Clean-in-place Processes for Optimised Process Control, Increased Process Efficiency and Quality
Siegmann-Hegerfeld T., Genner A., Brandstetter M., Miltner M., Lendl B., **Harasek M.**
-

01 TUESDAY, OCTOBER 1ST

SESSION 3.4

NEW HORIZONS IN ENERGY

CHAIRS: **Prof. Michael Georgiadis, Dr Martin Pavlas**

- 08:30 **KEYNOTE LECTURE**
OPPORTUNITIES FOR HEAT INTEGRATION OF BIOMASS-BASED FISCHER-TROPSCH CRUDE PRODUCTION AT SCANDINAVIAN KRAFTLINER MILL SITES
Ljungstedt H., Pettersson K., **Harvey S.**
-
- 08:50 Heat Transfer Intensified Techniques for Retrofitting Heat Exchanger Networks in Practical Implementation
Pan M., Bulatov I., Smith R.
-
- 09:10 Implementation of Heat Integration for Efficient Process Design of Direct Adipic Acid Synthesis in Flow
Vural Gürsel I., Wang Q., Noel T., Hessel V.
-
- 09:30 Energy Efficiency Improvement Through Technology Optimisation and Low Grade Heat – Recovery Industrial Application
Semkov K., Mooney E., Connolly M., Adley C.
-
- 09:50 Process Modification Potentials for Total Site Heat Integration
Chew K.H., Wan Alwi S.R., **Klemeš J.J.**, Manan Z.A.
-
- 10:10 An MILP Model for Distributed Energy System Optimisation
Haikarainen C., Pettersson F., Saxen H.
-
- 10:30 COFFEE BREAK (Main Lobby)
-
- 11:00 **PLENARY LECTURE II**
(ELAFOS Conference Room)
-

SESSION 3.5

NEW HORIZONS IN HEAT

CHAIRS: **Dr Costas Theodoropoulos, Dr Jordi Bonet Ruiz**

- 12:00 New Retrofit Approach for Optimisation and Modification for A Crude Oil Distillation System
Kamel D., **Gadalla M.**, Ashour F., Nour Aldin H.
-
- 12:20 Investigation of Alternative Reducing Agent Injection into the Raceway of Blast Furnaces Using CFD
Maier C., Jordan C., Harasek M., Feilmayr C., Thaler C.
-
- 12:40 CFD Modelling of Hydrodynamics and Heat Transfer in Channels of a PHE
Stogiannis I.A., Paras S.V. Arsenyeva O.P., Kapustenko P.O.
-

13:00	LUNCH (Hotel Restaurant – 10th floor)
13:45	POSTER SESSION – Best Poster Contest (Elafina Conference Room – 10 th floor)

SESSION 3.6

NEW HORIZONS IN MODELLING TECHNIQUES

CHAIRS: **Dr Christian Maier, Dr Flavio Manenti**

14:30	KEYNOTE LECTURE A METHODOLOGY FOR CREATING SEQUENTIAL MULTI-PERIOD BASE-CASE SCENARIOS FOR LARGE DATA SETS <i>Bungener S., Van Eetvelde G., Marechal F.</i>
15:10	The Use of Reduced Models in the Optimisation of Energy Integrated Processes <i>Smith R., Ochoa-Estopier L.M., Jobson M.</i>
15:30	Double Substrate Limitation Model for the Experimental Scale-up of Succinic Acid Production from Biorefinery Glycerol <i>Rigaki A., Webb C., Theodoropoulos C.</i>
15:50	Investigation of Heat Exchanger Network Flexibility of Distillation Unit for Processing Different Types of Crude Oil <i>Varga Z., Danics N.</i>
16:10	COFFEE BREAK (Main Lobby)

POSTER SESSION A
ELAFINA Conference Room
(10th Floor)

30 MONDAY, SEPTEMBER 30th
TIME: 13:45 - 18:00

POSTER SESSION A.1

PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT

- 01 Modular Integrated Framework for Process Synthesis and Optimisation Based on a Sequential Process Simulator
Wang D., Feng X., Deng C.
- 02 Optimisation of a Membrane-based Oxidative Coupling of Methane Reactor Using Surface Response Methodology
Patcharavorachot Y., Tiraset S., Saebea D., Arpornwichanop A.
- 03 Retrofit of Heat Exchanger Networks for Optimising Crude Oil Distillation Operation
Ochoa-Estopier L.M., Jobson M., Smith R.
- 04 Utilising Local District Heating Systems for Site-Wide Heat Integration of Industrial Clusters – a Process Integration Study
Hackl R., Morandin M., Harvey S.
- 05 Strategy for Total Energy System Retrofit of a Chemical Plant
Feng X., Liang C.
- 06 Automatic Synthesis of Alternative Heat-integrated Water-using Networks
Bao-Hong Li, Zhen-Zhen Ruan, Chuei-Tin Chang
- 07 A Generalized Approach to Handle Heat Exchange Restrictions in Energy Targeting
Morandin M.
- 08 Performance Assessment and Efficiency of a Renewable Hydrogen Production Station Based on a Supervisory Control Methodology
Ziougou C., Ipsakis D., Seferlis P., Bezergianni S., Papadopoulou S., Voutetakis S.
- 09 A Techno-economic Analysis of Using Residual Top Gases in an Integrated Steel Plant
Ghanbari K., Saxen H.
- 10 Design of Reverse Logistics Network for Waste Batteries with an Application in Turkey
Donmez I., Türkay M.

-
- 11 Process Heat Integration Between Distillation Columns for Ethylene Hydration Process
Pejpichestakul W., Siemanond K.
-
- 12 Addressing Energy and Environmental Targets Through Combined Process Integration Techniques
Mooney E., Semkov K., Adley C., Mooney C.
-
- 13 Process Integration in Energy and Carbon Intensive Industries Through Exploitation of Optimisation Techniques and Decision Support
Porzio G.F., Colla V., Matarese N., Nastasi G., Branca T.A., Amato A., Fornai B., Vannucci M., Bergamasco M.
-
- 14 Principle of Triple Bottom Line in the Integrated Development of Sustainable Products
Mattioda R.A., Fernandes P.T., Detro S., Casela J.L., Canciglieri Junior O.
-
- 15 Simulation of a Hybrid Reactive Extraction Unit. Biodiesel Synthesis
García Jurado M.B., Pleşu V., Bonet Ruiz J., Bonet Ruiz A.E., Tuluc A., Llorens Llacuna J.
-
- 16 Thermodynamic Analysis, Energy Integration and Flowsheet Improvement of a Methanol Absorption Acid Gas Removal Process
Gatti M., Marechal F., Martelli E., Consonni S.
-
- 17 Sustainable Remediation of a Closed Solid Waste Landfill Site: Development and Application of a Holistic Approach
Roccaro P., Vagliasindi F.G.A.
-

POSTER SESSION A.2

ENERGY SAVING TECHNOLOGY

-
- 18 The Precise Definition of the Payload Tube Furnaces for Units of Primary Oil Refining
Ulyev L., Kapustenko P., Melnykovskaya L., Nechyporenko D.
-
- 19 Energy Demand of Biofuel Production Applying Distillation and/or Pervaporation
Nagy E., Boldyryev S., Hegedüs I.
-
- 20 Applying Conduct - Metrical Method to Research of Foam Gypsum with Hemp Fibrous Reinforcement Drying Process
Gross U., Iljins U., Skujans J., Gajevskis A.
-
- 21 Power Quality Management of LED Light Sources in Frequency Domain
Gorbe P., Magyar A., Csuti P.
-
- 22 Energy Saving for Batch Distillation with Mechanical Heat Pumps
Modla G., Lang P.
-

-
- 23 Mathematical Modelling of the Steam Reforming of Toluene for Fuel Gas Production in a Fixed Bed Catalytic Reactor
Oliveira A., Silva J.
-

POSTER SESSION A.3

CO₂ MINIMISATION AND MITIGATION

-
- 24 Assessment of the Flue Gas Recycle Strategies on Oxy-coal Power Plants Using an Exergy-based Methodology
Hagi H., Nemer M., Le Moullec Y., Bouallou C.
-
- 25 Kinetic Studies on Carbon Dioxide Capture Using Activated Carbon
Rashidi N.A., Yusup S., Lam H.L.
-
- 26 Lithium Silicate Pellets for CO₂ Capture at High Temperature
Puccini M., Seggiani M., Vitolo S.
-
- 27 Multi-criteria Analysis of Material Selection in Order to Reduce Environmental Impacts
Čuláková M., Vilčeková S., Katunská J., Křídlová Burdová E.
-
- 28 Analysis of Environmental Aspects in High Energy Performance Family House Case Study
Vilčeková S., Sedláková A., Křídlová Burdová E., Čuláková M., Geletka V., Kapalo P.
-
- 29 Functionalization of Poly (high Internal Phase Emulsion) with Amine for CO₂ Capture
Muchan P., Saiwan C., Demontigny D., Tontiwachwuthikul P.
-
- 30 Biopolymer Modified with Piperazine-2-Carboxylic Acid for Carbon Dioxide Adsorption
Saiwan C., Srisuwanvichien S., Tontiwachwuthikul P.
-
- 31 Study of CO₂ Adsorption Using Adsorbent Modified with Piperazine
Kangwanwatana W., Saiwan C., Tontiwachwuthikul P.
-
- 32 Effect of Organic Solvents on Separation of Heat Stable Salts (hsss) Generated During Carbon Dioxide Absorption Using Amine Solution
Suppaibulsuka P., Saiwan C., Supap T.
-
- 33 Effect of Amines on High Internal Phase Emulsion Adsorbents for Carbon Dioxide Adsorption
Athipongarporn N., Saiwan C., Tontiwachwuthikul P.
-
- 34 Dynamic Modeling of CO₂ Capture by Calcium-looping Cycle
Cormos A.M., Simon A.
-

POSTER SESSION A.4

HEAT EXCHANGERS AS EQUIPMENT AND INTEGRATED ITEMS

-
- 35 Possibilities of Intensifying Heat Transfer in Heat Exchangers for High Temperature Applications
Stehlík P., Jegla Z., Kilkovský B.
-
- 36 Experimental and Numerical Investigation on Shell-side Performance of Multilayer Spiral-wound Heat Exchangers
Lu X., Du X., Zhang S., Zeng M., Wang Q. W.
-
- 37 Application of H₂ and H_∞ Approaches Applied to the Robust Controller Design for a Heat Exchanger
Vasičkaninová A., Bakošová M.
-
- 38 Modified Criterion for Economic Efficiency Estimation of Heat Pumps
Boldyryev S., Garev A., Ilunin O., Shamraev A., Selyakov O., Leshchenko O., Kapustenko P.
-

POSTER SESSION A.5

INTEGRATION OF RENEWABLES, BIOMASS AND ENERGY CONVERSION TECHNOLOGIES

-
- 39 Different Integration Alternatives of Thermosolar Energy and Heat Pump in a Fish Canning Process
Quijera J.A., Labidi J.
-
- 40 Biogas Upgrading Techniques: State of Art Review in European Region
Niesner J., Jecha D., Stehlík P.
-
- 41 Supervisory Control and Unattended Operation of an Off-grid Hybrid Power Generation Station Including Hydrogen Storage
Ziougou C., Elmasides C., Papadopoulou S., Voutetakis S.
-
- 42 Modeling and Simulation of Methanation Catalytic Reactor for Renewable Electricity Storage
Er-rbib H., Bouallou C.
-
- 43 Assessment of Direct Thermal Energy Storage Technologies for Concentrating Solar Power Plants
Ravaghi-Ardebili Z., Manenti F., Corbetta M., Lima N.M.N., Zuniga Linan L., Papisidero D.
-
- 44 Hydrogen Production from Mixture of Biomass and Polyethylene Waste in Fluidized Bed Catalytic Steam CO-gasification Process
Moghadam R.A., Yusup S., Lam H.L., Al Shoaibi A., Murni M.
-
- 45 Integrated Biomass and Solar Town Concept for Smart Eco-village
Hashim K., Ho W.S., Lim J.S., Macchietto S.
-
- 46 Lightweight Composites Based on Rapidly Renewable Natural Resource
Stevulova N., Cigasova J., Sicakova A., Junak J.
-

-
- 47 Investigation of the Influence of Plan Capacity on the Economic and Ecological Performance of Cassava-based Bioethanol
Lauven L.P., Liu B., Geldermann J.
-
- 48 Analysis of the Electricity Generation Potential by Solar Photovoltaic Source in the State of Parana Brazil
Tiepolo G.M., Canciglieri Junior O., Urbanetz Junior J.
-
- 49 Systematic Analysis of Proton Electrolyte Membrane Fuel Cell Systems Integrated with Biogas Reforming Process
Authayanun S., Aunsup P., Imorb K., Arpornwichanop A.
-
- 50 Experimental Study of a Single Particle Reactor at Combustion and Pyrolysis Conditions
Houshfar E., Wang L., Vaha-Savo K., Brink A., Lovas T.
-
- 51 Estimation of the Potential for Low Cost Solid Fuels of Selected Areas in Hungary and Greece
Karlopoulos E., Grammelis P., Christidou M., Chován T., Varbanov P.S., Klemeš J.J.
-

POSTER SESSION A.6

OPERATIONAL RESEARCH, SUPPLY CHAIN MANAGEMENT AND EDUCATION

-
- 52 Investigating the Causalities for Cleaner and Affordable Electricity Production Mix: a System Dynamic Methodological Approach
Tziogas C., Georgiadis P.
-
- 53 Sustainable Supply Network Design Through Optimisation with Clustering Technique Integration
Ng W.P.Q., Lam H.L.
-
- 54 The Role of Leadership in Knowledge Engineering Systems and Neural Networks to Establish E-government
Al-Dujaili M.A.A.
-
- 55 Use of a Web-based Modeling Environment in the Education of Process Engineers
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- 60 Mobile Thermocatalytic Waste Processing Complex
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- 62 Effect of the Type of Impellers on Mixing in an Electrochemical Reactor
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- 63 Optimal CuFe₂O₄ Load for MW Susceptible Catalyzed DPF
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- 64 Aftercooler for Efficiency Improvement of Decarbonizing Steam Generator
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- 65 Use of Tg-DSC-MS and Gas Analyzer Data to Investigate the Reaction of CO₂ and SO₂ with Ca(OH)₂ at Low Temperature
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- 66 Modernization of Unit for Elimination of Voc's by Catalytic Oxidation
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- 67 A New Solar Reactor Aperture Mechanism Coupled with Heat Exchanger
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- 68 Extraction of Copper from Aqueous Solutions Using Sodium Diethylthiocarbamate as the Extracting Agent
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01 **TUESDAY, OCTOBER 1st**

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- 70 Qualitative Analysis Based Reaction Mechanism Identification
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- 72 Assessment and Control of Environmental Performance of Bus Transit Operators: Three Cases in a Mid-sized City
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- 73 Perception of Users on the Environmental Impact Caused by Public Transport Operation
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- 74 Optimised Storage and Energy Efficiency Concepts in Industries, Commerce and District Heating Business Based on Tool Soco -Model and Measures Identified
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- 75 Productivity and Tensile Endurance Determination of Hemp Fiber
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- 76 Correlation Study of Safety, Health and Environmental Properties at Inherent Level: Benzene Synthesis Routes
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- 83 Leaching of Heavy Metals from Contaminated Sediment
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- 84 Life Cycle Assessment of Bottom Ash Management from a Municipal Solid Waste Incinerator (mswi)
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- 87 Off-cut Recycle for Batch and Batch Extractive Distillation Separation of a Multicomponent Azeotropic Mixture
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- 88 Potential Impacts on the Energy System at the Integrated Steelwork by Changing Injection Coal Types to the Blast Furnace
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- 97 Fractionation and Characterization of Insolubles Formed in Palm Oil Biodiesel
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- 100 The Study of Zeolite Based Cement Composites in Aggressive Environment
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- 113 Safety Assessment Curve (sac) for Inherent Safety Assessment in Petrochemical Industry
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- 116 Determination of Oil Products in Waste and Natural Waters using Tetrachloromethane
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GENERAL INFORMATION

REGISTRATION PROCEDURE

Delegates may receive their registration package at the conference registration desk located in the Hotel main lobby between 17:00-19:30 on Sunday September 29th. The registration desk will also be open for the registration of participants on Monday September 30th from 8:00 a.m. The delegates are kindly requested to wear their badges at all times during the conference.

Badges are coloured, as follows:

- Blue for the Conference Chairs and the plenary Speakers;
- Orange for the Scientific Committee;
- Red for the Organizing Committee;
- Green for the Delegates.

FIRST AID

First Aid Assistance (CPR trained personnel) is available on site throughout the event. In case of an emergency notify the registration desk.

EMERGENCY CONTACT NUMBERS

The emergency number for all purposes in Greece is **112** (free of charge from mobile phones).

WIRELESS INTERNET

Free wireless Internet access is provided for all conference attendants in all conference lecture halls and common areas of the hotel. The password to access the wireless network is "ahr2013". There is no need to change the username.

CELLULAR PHONES & PAGERS

As a courtesy to all meeting attendees and speakers, cellular phones, pagers and other electronic devices must be turned off or operated in silent mode during sessions.

CERTIFICATE OF ATTENDANCE

A certificate of attendance will be provided to all participants at the registration desk.

FOOD & BEVERAGE

Refreshments and light snacks during the coffee breaks (Main Lobby Area) and Lunches (Hotel Restaurant – 10th Floor) are included in the registration fee. Lunch cards would be provided to the delegates in the registration package.

INSTRUCTIONS TO SESSION CHAIRS

- Please take a moment to identify the session you are chairing or co-chairing and identify its location. Ensure that you arrive at your session room well before the session commences to allow the technical assistants to explain any specific functionality of the room equipment and to identify the session speakers. Please report any problem to the technical assistants.
- Session Chairs should keep strictly the time schedule to enable participants to follow the technical programme. In case of a presenter being absent the session chair should delay the session until the next scheduled presentation.

INSTRUCTIONS TO ORAL PRESENTERS

- Please ensure you arrive at the designated session room before the session starts so that you can notify the session chair about your presence, upload your presentation at the provided computer (running Office 2010) and become familiar with the presentation space and the audio/visual equipment in the room.
- Keynote lectures are allocated 30 minutes for the presentations followed by 10 minutes for questioning.
- Regular presentations are allocated 15 minutes for the presentation followed by 5 minutes for questions.
- All presenters are kindly asked to keep the time schedule so that participants can follow the lecture programme.
- Session chairs have been given instructions for the strict satisfaction of the time schedule. Therefore, presenters will be notified about their time by the session chair.

INSTRUCTIONS TO POSTER PRESENTERS

- The poster stands have dimensions of 90 cm x 160 cm. A0 poster size appears to be ideal. Each stands will have a tag indicating the poster number.\
- Organizers will provide the material for hanging the posters.

- Poster sessions begin at 13:45 on Monday and Tuesday so it is recommended that presenters place their posters before that time. Posters should be removed around 18:00 every day.

PRIZES & AWARDS

PRES conference series have established a tradition of selecting the best three poster presentations to researchers with a vital contribution towards enhancing our understanding of process integration for energy conservation, pollution reduction and related topics. Clarity of presentation and knowledge of the subject are additional selection criteria.

The PRES'13 Best Poster Presentation Awards recipients will be selected by a Special Selection Committee from members of the International Scientific Committee. The award will be presented during the Conference Gala Dinner on Tuesday October 1st.

TAXI / BUS

The Amathus Beach Hotel is 15 minutes away by car from Rhodes International Airport and 10 minutes away by car from the Rhodes City centre. A taxi ride from the airport costs around 12-15 €. Public transportation is available throughout the day to the Airport and the City of Rhodes. The bus stop is located just outside the hotel. The cost of one way bus ticket from the Airport to the Hotel is 2.30 €. Tickets can be purchased from the bus driver. Seek travel information from the bus driver. During your stay at the Amathus Beach Hotel, taxis can be called by contacting the Hotel Reception at the lobby area.




SOCIAL PROGRAMME

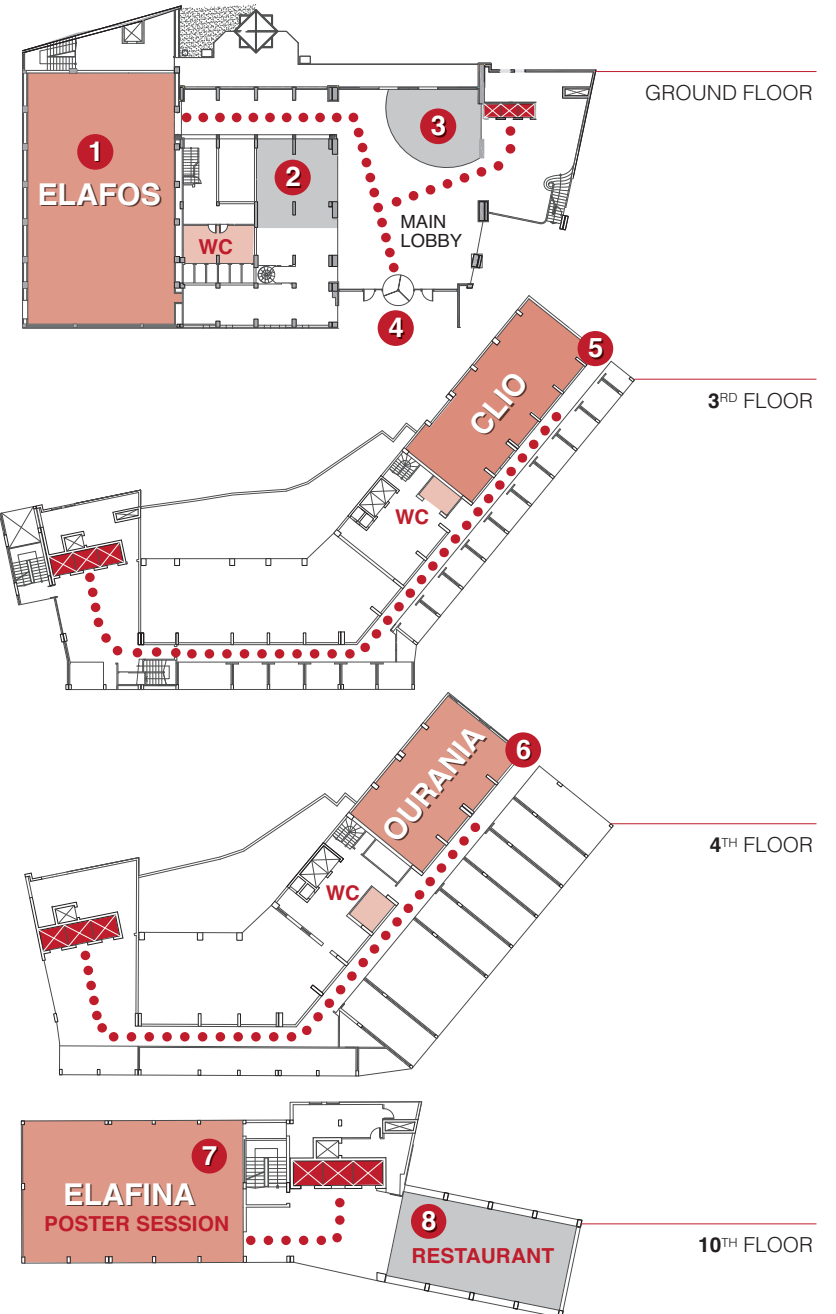
The **Welcome Reception Party** will take place at the Swimming Pool Area on the 11th floor of the Amathus Beach Hotel from 19:30pm until 21:30pm. Light snacks and drinks will be offered to all conference attendants.

The **Conference Gala Dinner** will take place at the Swimming Pool Area on the 11th floor of the Amathus Beach Hotel on Tuesday October 1st, between 20:00pm and 24:00pm. Invitations to the dinner are included in the registration package for full rate participants and for those who selected the Dinner option. A rich buffet offering the best of Mediterranean Greek Cuisine and excellent local wines will set the background for a relaxed evening to reflect on the scientific endeavours presented at the conference. The PRES'13 **Best Poster Presentation Award** will be presented during the Gala Dinner.

AMATHUS BEACH HOTEL FLOOR PLANS

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