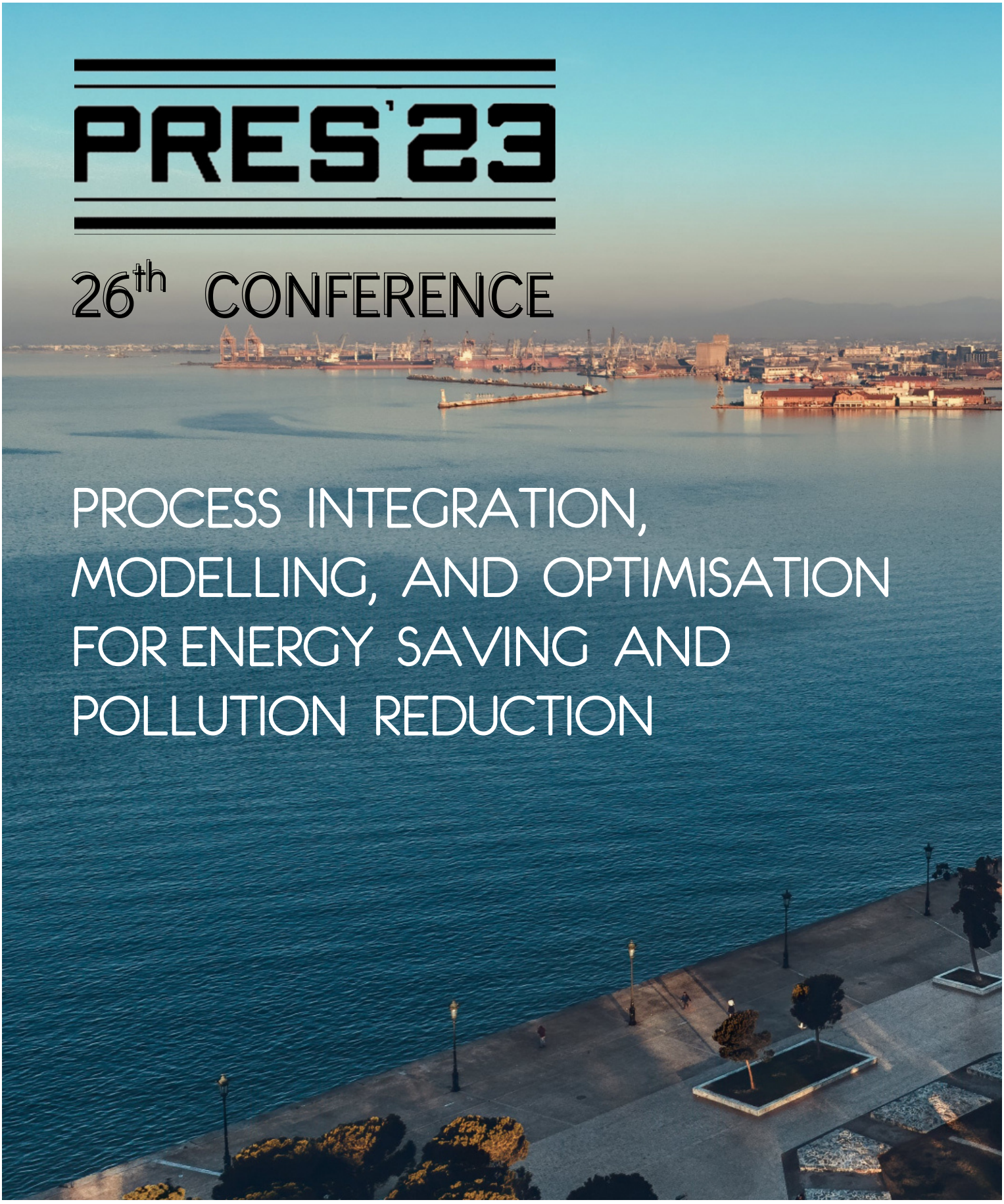
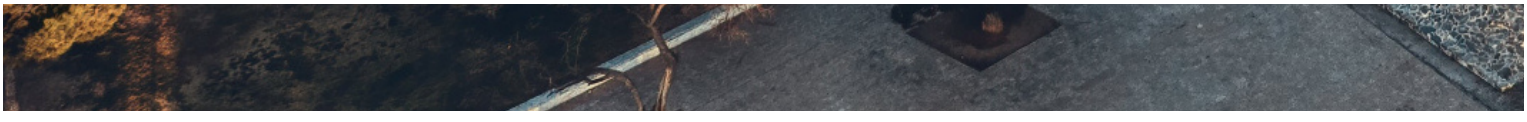
PRES'23

26th CONFERENCE

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



OCTOBER 8 - 11, 2023
THESSALONIKI, GREECE



PRES'23

WELCOME

PRES'23 International Scientific and Organisation Committees welcome all participants to the twenty-sixth event in the series of PRES conferences in Thessaloniki, Greece. The PRES conference series was initiated by Professor Jiří Jaromír Klemeš and President of the PRES series. Its first version was organised in 1998 in collaboration with the Professor Zdeněk Buriánec and Professor Petr Stehlík within the framework of the CHISA congresses. Under the leadership of Professor Jiří J. Klemeš, the conference became an established independent venue in collaboration of the conference PRES'99 with ESCAPE-9, hosted jointly with Hungarian colleagues in Budapest, in 1999. The strong partnership with the Italian Association of Chemical Engineers resulted in the joint organisation of PRES events with the Italian Chemical Engineering Conference (ICheaP) and the publication of conference papers in a dedicated volume of Chemical Engineering Transactions (cited by SCOPUS). With a growing global presence, PRES events have become widely recognised and visited countries where strong communities in Process Integration, modelling, and optimisation have been developed – such as Kuching, Malaysia in 2015 and Tianjin, China in 2017. The other PRES venues in Canada (2003), Italy – multiple times, in Greece, China, Croatia, and Czechia, have built a strong international network of Process Integration and Pollution Reduction experts that provides a unique platform for scientific and engineering discussions, as well as forging project collaborations.

PRES returns to Greece in 2023 after two successful events in 2013 and 2019. This year the conference is co-organised by the School of Mechanical Engineering of Aristotle University of Thessaloniki (AUTH), Chemical Process Engineering and Energy Resources Institute (CPERI) of the Centre for Research and Technology – Hellas (CERTH), and the Sustainable Process Integration Laboratory – SPIL, NETME Centre, in the Faculty of Mechanical Engineering of Brno University of Technology – VUT Brno.

The aim of PRES'23 is to provide a platform for knowledge sharing and dissemination, reviewing the latest research developments and applications as well as cutting-edge results in new and emerging technologies in the fields of Process Integration, Mathematical Modelling and Optimisation as systematic approaches for energy savings and pollution reduction enabling sustainable process systems and cleaner production.

The conference attracted more than 375 abstracts authored by more than 1020 researchers from 52 countries. Of these, 79 papers are presented in the online platform, and 145 papers are in hybrid mode – presented on-site and online. Four plenary lectures from leading scientists in the field of Process Integration and Industrial Ecology set off the scientific discourse, followed by, 19 keynote presentations, 160 oral presentations, and 60 poster presentations. All papers have undergone a thorough peer-review process to ensure the highest technical quality, assisted by 93 expert reviewers. A special Poster Selection Committee will evaluate poster presentations for technical quality,

presentation skills, clarity of reasoning, the strength of arguments to the questions posed by the Committee members and finally poster content. A number of awards will be announced at the Gala-Awards Conference Dinner on October 11th. Selected papers from PRES'23 are published in Volume 103 of Chemical Engineering Transactions by AIDIC, with many more papers to be invited by the International Scientific Committee to submit full research manuscripts to Special Issues in leading scientific journals: Journal of Cleaner Production (IF 2022: 11.1), Energy (IF 2022: 9.0), Energies (IF 2022: 3.2, Open Access), Cleaner Energy Systems (Open Access). More special issues are being negotiated.

PRES'23 in Thessaloniki, Greece offers a rich social programme to facilitate networking among conference participants. Whether meeting old friends and colleagues or getting introduced to the PRES family for the first time, the welcome reception party on Sunday, October 8th sets the stage for the commencement of the scientific dialogue and friendly conversations. The daily coffee and lunch breaks not only immerse participants in the traditional local cuisine but mainly enable the continuation of discussions initiated during the technical sessions. A boat-cruise in Thessaloniki bay on Tuesday, October 10th aims to close the day in the relaxing fashion. The Conference Gala-Awards dinner planned for the evening of Wednesday, October 11th promises to conclude PRES'23 in style. The closing event includes a special entertainment programme, providing a relaxed environment to continue facilitating discussions, recognise excellent research contributions, and look forward to another successful PRES conference in Xi'an, China next year.

Thessaloniki is a city with a history of more than 2,300 years in which multi-culturalism is at the epicentre. Nowadays, a cosmopolitan modern city but with a unique character that residents and visitor feel they all belong in one big family. Explore the lively neighbourhoods, the little coffee-shops for vivid conversations, and the tavernas with simple and sbtle tastes that make Thessaloniki a gastronomic megastar. Enjoy a long walk at the 5 km stretch of the seaside promenade, climb to the city medieval wall and fortification, visit the byzantine Christian Orthodox churches of magnificanet architecture and absorb the serene sounds of byzantine chants.

PRES'23 greatly values the efforts of the conference chairs and the members of the International Scientific Committee. The Organising Committee worked hard to manage the participation of delegates from all over the world. The contribution of AIDIC in the publication of a dedicated Volume of Chemical Engineering Transactions and the use of the COMET platform by the SDEWES Centre is greatly appreciated. PRES'23 greatly appreciates the supporters of the Conference and especially the personnel of Machine Dynamics Laboratory in the School of Mechanical Engineering AUTH, the Process Systems and Implementation Laboratory CPERI/CERTH and the Sustainable Process Integration Laboratory – Faculty of Mechanical Engineering at VUT for all their hard work for the preparation of the Conference.

Panos Seferlis, Petar Sabev Varbanov, Athanasios I. Papadopoulos, Yee Van Fan
PRES'23 Chairs

ABOUT
PRES SERIES

PRES'23 is the twenty-sixth event in the series. It was initiated by Professor Jiří J. Klemeš with Professor Zdenek Burianek in the framework of CHISA conferences. The first independent venue was PRES'99 in Budapest. Following is the full list of the PRES venues.

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**
17	**2014**	Prague	**Czech Republic**
18	**2015**	Kuching, Sarawak	**Malaysia**
19	**2016**	Prague	**Czech Republic**
20	**2017**	Tianjin	**China**
21	**2018**	Prague	**Czech Republic**
22	**2019**	Agios Nikolaos, Crete	**Greece**
23	**2020**	Xi'an	**China**
24	**2021**	Brno	**Czechia**
25	**2022**	Bol, Split	**Croatia**
26	**2023**	Thessaloniki	**Greece**

TOPICS

CONFERENCE FORMAT

PRES'23 conference focuses on the following topics

Process Integration for sustainable development
Process analysis, modelling and optimisation
Total Site Integration
Heat transfer and heat exchangers
Energy saving and clean technologies
Sustainable processing and production
Renewable and high efficiency utility systems
Footprint minimisation and mitigation
Operations and supply chain management
Waste minimisation, processing and management
Batch process analysis and integration
Process network dynamics, flexibility and control
Industrial implementation and optimisation
Numerical fluid flow and heat transfer simulation
Sustainability and Process Integration teaching, learning and knowledge tools

Special Events

Forum in Memory of Professor Jiří Jaromír Klemeš
SPIL-RESHeat Symposium

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M. Zeng	Xi'an Jiaotong University	CN

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J.S Lim	Universiti Teknologi Malaysia	MY
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D. Misirlis	International Hellenic University	GR
Z. Vlahostergios	Democritus University of Thrace	GR
D. Ipsakis	Technical University of Crete	GR

PLENARY SPEAKERS

ANTONIS KOKOSSIS
National Technical University of Athens

Process systems engineering as a technology driver in the transition to renewable industrial production

Professor Kokossis holds a Diploma in Chemical Engineering from NTUA and a PhD from Princeton University. He returned to his alma mater in 2009 following an overseas academic career in UK at the University of Manchester (formerly UMIST) and the University of Surrey. He holds expertise in process systems design and process integration, recently with a strong emphasis on renewable energy systems, process intensification and the design of biorefineries and industrial symbiosis networks. His research has addressed the design of multiphase reactors, complex separation and reactive-separation systems, energy and power networks, and environmental problems across a wide spectrum of applications (water reuse, recycle, and regeneration systems, wastewater management, gasification, waste to energy projects). He has established collaboration with several industrial companies including several industries dedicated to the development of renewable energy and chemicals. He has graduated 25 PhD and 46 MSc students. He holds 142 communications in International conferences, 129 publications in peer-reviewed journals, and 70 invited lectures in conferences universities, and multinational companies. He has served as the National Representative of the International Energy Agency (IEA), and currently as the National Representative of the IBISBA EU research infrastructure on Industrial Biotechnology, and the Computer Aided Process Engineering (CAPE) Group of the European Federation of Chemical Engineering (EFCE). Prof Kokossis is a Fellow of IChemE and an elected member of the Executive Board of the European Federation of Chemical Engineering (EFCE).

ROBIN SMITH
The University of Manchester

Finding a Route to Net-zero Carbon Emissions for Process Utility Systems

Director of the Centre for Process Integration in the School of Chemical Engineering and Analytical ---Science of The University of Manchester.
Co-founder of Process Integration Limited and Process Asset Integration Management Limited (ProAim), both spin-out companies from the University.
Extensive industrial experience with Rohm & Haas in process investigation, production and process design, and with ICI in process modelling and process integration.
Acted extensively as a consultant to industry in process integration projects.
Fellow of the Royal Academy of Engineering. Fellow IChemE.
Published widely in the field of Process Integration and is author of “Chemical Process Design and Integration” by Wiley. He is a Fellow of the Royal Academy of Engineering, a Fellow of the Institution of Chemical Engineers in the UK and a Chartered Engineer. In 1992 he was awarded the Hanson Medal of the Institution of Chemical Engineers for his work on waste minimisation. In 2018 he was awarded the Sargent Medal of the Institution of Chemical Engineers in recognition of over 35 years leadership and pioneering research leading to conceptual development of advanced process integration principles and methodologies.

KATHLEEN B. AVISO
Chemical Engineering Department Gokongwei College of Engineering De La Salle University, Manila, Philippines

Game Theoretic Defense of Input-Output Systems

Kathleen B. Aviso is a University Fellow and a Professor of the Department of Chemical Engineering at De La Salle University, Manila, Philippines. She is also the current Dean of the Gokongwei College of Engineering of the university. Her main research interest is the development of decision support tools for environmental decision-making. She earned her Ph.D. degree in Industrial Engineering from De La Salle University. She is the author of more than 240 Scopus-indexed publications with an h-index of 32. She is currently an executive editor for the Journal of Cleaner Production (published by Elsevier), an associate editor for Digital Chemical Engineering, and the South African Journal of Chemical Engineering, and part of the editorial board of several other international journals published by Elsevier and Springer Nature. She is the author of the book Input-Output Models for Sustainable Industrial Systems. For her scientific work, Prof. Aviso has received multiple scientific awards from government and professional organizations in the Philippines.

YULONG DING
University of Birmingham

Thermal Energy Storage Using Composite Phase Change Materials - From Materials, to Devices, and System Integration and Optimisation

Professor Ding is founding Chamberlain Chair of Chemical Engineering and founding Director
of University of Birmingham Centre for Energy Storage. His research has been on energy materials and processes. He has published 550+ technical papers with 450+ in peer-reviewed
journals (GS H-Index ~80) and filed 100+ patents. He currently serves on The Royal Society Net Zero Panel and IChemE Publication Medal Assessment Panel, and recently led a Royal Society briefing note on heating and cooling in Climate Change: Science and Solutions. He invented liquid air energy storage technology and led the initial stage of technology developments (Highview Power). He developed composite phase change materials for thermal energy storage and associated large-scale manufacture technologies, leading to large scale commercial applications with a total installation of >300MW / >1.5GWh so far (Jinhe Energy). His work on passively cooled container technology has been on large scale commercial demonstration for cold chain applications (CRRC). His work has been recognised by the ESIE Outstanding Achievement Award (2022), the IChemE Clean Energy Medal (2021); the election to Fellow of Royal Academy of Engineering (2020); the IChemE Global Awards in three categories of Energy, Research Project and Outstanding Achievement (2019); and Energy & Environment Award and Technology and Innovation Grand Prix Award ('The Engineer', 2011).

SUPPORTED BY

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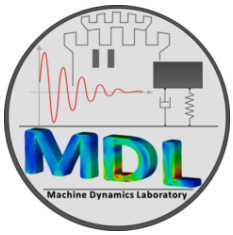

ACKNOWLEDGEMENTS

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The International Scientific Committee would like to gratefully express thanks to the 93 expert reviewers who have helped in successfully completing the peer review process for the Chemical Engineering Transactions volume and the PRES'23 Proceedings volume.

The team of the Sustainable Process Integration Laboratory – SPIL, NETME Centre, in the Faculty of Mechanical Engineering of the Brno University of Technology – VUT Brno would like to express the appreciation to the EU project "Sustainable Process Integration Laboratory – SPIL", EU project No. CZ.02.1.01/0.0/0.0/15_003/0000456 funded by EU "Operational Programme Research, Development and Education", Priority 1: Strengthening capacity for quality research for supporting the PRES'23 venue with a multidisciplinary platform for sustainability knowledge sharing.

Energies (ISSN 1996-1073) - an open-access journal of related scientific research, technology development and policy and management studies, published by MDPI, for Sponsoring the Best Poster Award.

De Gruyter academic publishing for sponsoring the best paper awards.

	CONFERENCE HALLS				
TIME	**DIAS LEVEL 7**	**POSEIDON A+C MEZZANINE OCT 9-10TH BACKYARD LEVEL 0 OCT 11TH**	**IFIGENIA LEVEL –1**	**NAFSIKA LEVEL –1**	**POSEIDON B MEZZANINE**
8	**SUNDAY**, OCTOBER **8TH**				
14:00	REGISTRATION (DIAS HALL – LEVEL 7)				
17:00	**OPENING SESSION**				
18:00	**PLENARY SESSION I**				
20:00	WELCOME PARTY (DIAS HALL – LEVEL 7))				
9	**MONDAY**, OCTOBER **9TH**				
8:00	REGISTRATION (DIAS HALL – LEVEL 7)				
9:00	**PLENARY SESSION II**				
10:00	**GROUP PHOTO**				
10:15	COFFEE BREAK (DIAS HALL – LEVEL 7)				
	FORUM J.J.KLEMEŠ				
13:00	LUNCH (COOKOO RESTAURANT – LEVEL 0 & DIAS HALL VERANDA – LEVEL 7)				
14:30	**Session 1.1** PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT	**Session 1.2** CO_2 CAPTURE, SEQUESTRATION AND UTILISATION	**Session 1.3** ENERGY SAVING & CLEAN TECHNOLOGIES	**Session 1.4** RESHEAT WORKSHOP	POSTER SESSION
19:30	PRISE FOUNDATION MEETING (BY INVITATION)				
20:30	ISC DINNER (BY INVITATION)				

10	**TUESDAY**, OCTOBER **10TH**				
08:30	REGISTRATION (DIAS HALL – LEVEL 7)				
09:10	**Session 2.1** PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT	**Session 2.2** HEAT TRANSFER & HEAT EXCHANGERS	**Session 2.3** RENEWABLE & HIGH EFFICIENCY UTILITIES	**Session 2.4** SUSTAINABLE PROCESSING & PRODUCTION	POSTER SESSION
10:30	COFFEE BREAK (DIAS HALL – LEVEL 7)				
11:00	**PLENARY SESSION III**				
12:00	LUNCH (COOKOO RESTAURANT – LEVEL 0 & DIAS HALL VERANDA – LEVEL 7)				
13:30	**Session 2.5** WASTE MINIMISATION, PROCESSING & MANAGEMENT	**Session 2.6** CO_2 CAPTURE, SEQUESTRATION AND UTILISATION	**Session 2.7** PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT	**Session 2.8** ENERGY SAVING & CLEAN TECHNOLOGIES	POSTER SESSION
15:30	COFFEE BREAK (DIAS HALL – LEVEL 7 & IFIGENIA-NAFSIKA LOBBY – LEVEL –1)				
16:00	**Session 2.9** PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT	**Session 2.10** CO_2 CAPTURE, SEQUESTRATION AND UTILISATION	**Session 2.11** PROCESS ANALYSIS, MODELLING & OPTIMISATION	**Session 2.12** INDUSTRIAL IMPLEMENTA-TION & OPTIMISAITON	POSTER SESSION
19:00	BOAT CRUISE (WHITE TOWER SEAFRONT AREA)				

11	**WEDNESDAY**, OCTOBER **11**TH				
08:30	REGISTRATION (DIAS HALL – LEVEL 7)				
09:10	**Session 3.1** FOOTPRINT MINIMISATION & MITIGATION	**Session 3.2** OPERATIONS & SUPPLY CHAIN MANAGEMENT	**Session 3.3** SUSTAINABLE PROCESSING & PRODUCTION	**Session 3.4** PROCESS ANALYSIS, MODELLING & OPTIMISATION	
10:30	COFFEE BREAK (DIAS HALL – LEVEL 7)				
11:00	**PLENARY SESSION IV**				
12:00	LUNCH (COOKOO RESTAURANT – LEVEL 0)				
13:30	**Session 3.5** PROCESS ANALYSIS, MODELLING & OPTIMISATION	**Session 3.6** RESHEAT WORKSHOP	**Session 3.7** ENERGY SAVING & CLEAN TECHNOLOGIES	**Session 3.8** WASTE MINIMISATION, PROCESSING & MANAGEMENT	
20:00	GALA AWARDS DINNER (DIAS HALL – LEVEL 7)				

PROGRAMME

8 SUNDAY, OCTOBER 8TH

DIAS HALL – Level 7

14:00 REGISTRATION (DIAS HALL LOBBY)

17:00 **OPENING CEREMONY**

CHAIRS: **Panos Seferlis, Yee Van Fan**

Welcome address

Kyros Yakinthos, Dean Faculty of Engineering AUTH

Welcome address

Paris Voutetakis, Director Chemical Process and Energy Resources Institute/CERTH

Welcome address

George Savvaidis, Head School of Mechanical Engineering AUTH

Welcome address

Ferenc Friedler, Rector, Széchenyi István University - Győr, Hungary

Welcome address

Jiří Klemeš, Brno University of Technology

OPENING LECTURE

Twenty-Six Years of the PRES Conference: Progress and Contributions to Sustainable Process Integration

*Yee Van Fan, **Petar Sabev Varbanov**, Panos Seferlis, Ferenc Friedler, Jiří Klemeš*

18:00 **PLENARY LECTURE I and GUEST of HONOUR**

CHAIRS: **Peter Sabev Varbanov, Athanassios Papadopoulos**

GUEST of HONOUR

Conceptual and complex approach contributing to energy self-sufficiency

Petr Stehlík

18:30 **PLENARY LECTURE I**

Process systems engineering as a technology driver in the transition to renewable industrial production

Antonis Kokossis

20:00 Welcome Reception (DIAS HALL – LEVEL 7)

9 MONDAY, OCTOBER 9TH

DIAS HALL (LEVEL 7)

8:00	REGISTRATION (DIAS HALL LOBBY)

PLENARY LECTURE II

CHAIRS: **Ferenc Friedler, Petr Stehlík**

9:00	Finding a Route to Net-zero Carbon Emissions for Process Utility Systems ***Robin Smith***
10:00	**GROUP PHOTO**
10:15	COFFEE BREAK (DIAS HALL – LEVEL 7)

FORUM in MEMORY of Jiří Jaromír Klemeš

CHAIRS: **Panos Seferlis, Petar Sabev Varbanov**

10:45	**DISCUSSION PANEL** Resource Efficiency and Sustainability - Energy and Process Integration – Jiří Jaromír Klemeš Panel members on-site: ***Robin Smith, Zdravko Kravanja, Petr Stehlík, Petro Kapustenko, Hrvoje Mikulčić, Raymond Tan, Vyacheslav Kafarov, Truls Gundersen, Ferenc Friedler*** Zoom link: ***Paweł Ocłoń***
12:30	**BEST PAPER AWARD "Jiří Jaromír Klemeš"** CHAIRS: **Xue-Chao Wang, Panos Seferlis, Petar Sabev Varbanov** AWARD HANDLING: **Jiří Klemeš**
13:00	LUNCH (Cookoo Restaurant – LEVEL 0 & DIAS HALL Veranda – LEVEL 7)

DIAS HALL (LEVEL 7), OCTOBER 9TH

SESSION 1.1

PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT

CHAIRS: **Adeniyi Isafiade, Dhabia Al Mohannadi**

14:30	**KEYNOTE LECTURE** Pinch Analysis for Temporally Constrained Carbon Trading ***R. R. Tan**, S. Bandyopadhyay, D. Foo, M. V. Migo-Sumagang, K. Aviso*
15:10	Uncovering the European power infrastructure: Digital twin and multivariate analysis ***S. Y.Teng**, Á. Orosz, F. Friedler, J. Jansen*
15:30	Incorporation of Epistemic Uncertainties in Resource Conservation Networks with multiple resources using Interval Pinch Analysis ***A. Pandey**, S. Bandyopadhyay*
15:50	Integrated Renewable Energy and Resource Network Optimisation for Off-Grid Energy Supply to Rural Communities ***K. Jegede**, A.J. Isafiade, M. Short*
16:10	Pinch Analysis-based Targeting Multiple Resources in Resource Conservation Networks ***M. U. Ashna**, S. Bandyopadhyay*
16:30	A Novel Integrated System Driven by sCO_2 Power Cycle for the Simultaneous Energy, Water and Waste Management ***S. M. Alirahmi**, G. Sin, A. Arabkoohsar, T. Gundersen, H. Yu*

POSEIDON A+C HALL (Mezzanine), OCTOBER 9TH

SESSION 1.2

CO_2 CAPTURE, SEQUESTRATION AND UTILISATION

CHAIRS: **Chakib Bouallou, Alexios S. Kyriakides**

14:30	**KEYNOTE LECTURE** Techno-Economic Evaluation of Synthetic Natural Gas Production Based on Biomass Gasification with CO_2 Capture ***C. C. Cormos**, M. Dragan, L. Petrescu, S. Dragan, A. M. Cormos, S. C. Galusnyak, F. M. Ilea, A. M. Bathori*
15:10	Techno-economic assessment of carbon-negative multigeneration systems based on steam reforming technologies for utilizing flare gas at CO_2-EOR projects ***M. Moosazadeh**, A. S. Tayerani Charmchi, P. Ifaei, T. Woo, C. Yoo*
15:30	Effect of Sulfate Anions on the CO_2 Absorption Performance of Aqueous Amine Solutions ***F. Tzirakis,** A. I. Papadopoulos, P. Seferlis, I. Tsivitzelis*
15:50	Advanced Control of Post-combustion Carbon Capture Plant Using a PI and Model Based Approach ***F. M. Ilea**, A. M. Cormos, V. M. Cristea*
16:10	Influence of Flue Gas Pollutants on Solvent-Based CO2 Capture: A Techno-Economic and Dynamic Performance Analysis ***P. Kazepidis**, A. I. Papadopoulos, P. Seferlis*
16:30	Design and Integration of a CO_2 Capture Plant using Piecewise Steady-State Simulation and Process Integration ***B. H. Y. Ong**, A. Duss, J. Grand, R. Agner, B. Wellig*
16:50	Zeolites for Direct Carbon Dioxide Capture ***C. T. Ferré**, R. Cabello, A. E. Plesu Popescu, J. Bonet-Ruiz, P. Gamallo Belmonte, J. Camps*

IFIGENIA HALL (LEVEL –1), OCTOBER 9TH

SESSION 1.3

ENERGY SAVING AND CLEAN TECHNOLOGIES

CHAIRS: **Florian Schlosser, Zinon Vlachostergios**

14:30	**KEYNOTE LECTURE** Generation and Network Planning of Utility-scale Grid-connected Microgrids *G. Abantao, P. E. D. Bundoc, J. Ibanez, L. L. Blas, X. Penisa, E. J. Esparcia, M. Castro, R. V. Buendia, K. E. Pilario, A. E. Tio, I. B. N. Cruz, J. Ocon,* ***C. M. Odulio***
15:10	Energy Efficient Drive Management of Lightweight Urban Vehicle ***Z. Pusztai****, F. Szauter, F. Friedler*
15:30	Techno-economic Analysis of Tidal Energy Devices Within the Dinagat Islands in the Philippines *E. Caquilala, L.A. Danao,* ***B. Abuan***
15:50	Energy Management with Q-Learning Algorithm for a Parallel Plug-In Hybrid Vehicle ***N. Aletras****, P. Karadimitriou, Z. Samaras, L. Ntziachristos*
16:10	Modeling of Molten Hydroxide Direct Carbon Fuel Cell – Effect of Carbonate Formation, J. Ortenero ***J. Ortenero****, C. Doma, R.J. Rubin, K.C.K.V. Reyes, V. Bungay*
16:30	Mobile solution for digestate transformation to high added-value products ***V. Proskynitopoulou****, P. Dimopoulos Toursidis, A. Vourros, I. Garagounis, S. Lorentzou, A. Zouboulis, K. Panopoulos*

NAFSIKA HALL (LEVEL –1), OCTOBER 9TH

SESSION 1.4

RESHeat WORKSHOP: BUILDING ENERGY SUPPLY WITHIN THE SUSTAINABLE DEVELOPMENT CONTEXT

CHAIRS: **Petar Sabev Varbanov, Jiří Klemeš**

14:30	**KEYNOTE LECTURE** Simulation of heat transfer process in a novel phase change material used for solar thermal energy storage *N. Cabrera Ruiz, V. Lizcano-González, **V. Kafarov**, K. Mahkamov*
15:10	Effects of chemical kinetic mechanism on pollutant NO prediction of turbulent diffusion flame using large eddy simulation *R. Waluyo, **M. Aziz***
15:30	Validation of the Coupled Heat and Moisture in the Soil for Underground Thermal Energy Storage Systems ***S. Zhang**, P. Ocłoń, M. A. Yildirim, P. S. Varbanov, O. Arsenyeva, P. Kapustenko*
15:50	ANSYS Mosaic Poly-Hexcore Mesh for Cavitation and Pressure Pulsation Prediction in Double-Volute Double-Suction Pump ***V. Arocena**, L.A. Danao*
16:10	Multi-Objective Robust Optimization for Wastewater-Food-Energy Nexus with Eco-Compensation at A Lake Scale ***L. He**, Liming Yao, Petar Sabev Varbanov, Yee Van Fan*
16:30	Performance analysis of thermoelectric generators with hexagonal hollow legs for cleaner production *T. Yan, W. Yang, D. Zheng, **J. Wang**, T. Ma, P.S. Varbanov*
16:50	Environmental Benefits of an Innovative System for Exploitation of Excess Heat from Cogeneration Gas Engines ***J. Puhar**, D. Urbancl, D. Krajnc, D. Goricanec, A. Vujanovic*

POSEIDON B HALL (Mezzanine), OCTOBER 9-10TH

POSTER SESSION (ALL DAY)

01	Integrated Monitoring System For Growing Grain Crops *N. Kulenova, **M. Sadenova**, Z. Anuarbek, N. Beisekenov*
02	Optimal HEN with PHEs for Carbon Dioxide Capture by Amine Absorption Unit at Coal Fired Power Station ***P. Kapustenko**, J.J. Klemeš, O. Perevertaylenko, L. Tovazhnyanskyy, O. Arsenyeva, E. Klochok, V. Ved*
03	CCUS Technology and Related technical Methods Help to Achieve the Goal of Carbon Neutrality *S. Gong, S. Yang, **B. Wang**, F. Wang, Z. Jiang, H. Tao, L. Gai*
04	Coastal LNG cold energy cascade utilisation optimisation accounting for environmental footprints *F. Wang, **B. Wang**, L. Gai, Y. Chen, H. Tao, B. Zhu, F. Sher, P.S. Varbanov*
05	Co-conversion of Coal-bed Methane and Coal based on Modular Plant Integrated with Conventional Plant toward High Yield *Q. Zhou, **M. Yang**, X. Feng*
06	CFD analysis of packed bed reactor for green hydrogen production by biogas reforming *A.D. Selejan, V.C. Sandu, **A.M. Cormos**, S. Dragan, C.C. Cormos*
07	Effect of PCHE channel shape on thermal-hydraulic characteristics of supercritical LNG *X. Yang, W. Yang, H. Zhu, **J. Wang**, T. Ma, P.S. Varbanov*
08	Optimal Investment Strategies in a Joined Natural Gas and Carbon Emission-embedded Electricity Market ***M. Kanta**, E.G. Tsimopoulos, C.N. Dimitriadis, M. Georgiadis*
09	Fluid flow and heat transfer CFD analysis inside solar flat plate collectors *K. Haghverdi, G. Martinopoulos, **D. Misirlis***
10	Numerical simulation of blade-shaped riblets using LES based methods ***C. Bliamis**, Z. Vlahostergios*, D. Misirlis, K. Yakinthos*

11 Numerical simulation of blade-shaped riblets using LES based methods
*C. Bliamis, **Z. Vlahostergios**, D. Misirlis, K. Yakinthos*

12 Optimization of Microalgal Biomass Production Scheduling amidst Culture Crash
***I.H. Gue**, J.L. San Juan, A.P. Mayol*

13 Multi-Objective Optimisation of Integrated Bio-Energy Supply Chain and Heat Exchanger Network Retrofit for Multi-Period Operations Considering Economics and Environmental Impact
A.J. Isafiade

14 Integrated Renewable Energy and Polygeneration Hub Design for Industrial Heat and Power Utilisation
***T. Chitsiga**, A.J. Isafiade*

15 Process Design and Optimization of Membrane-Based Capture Systems for SMR Hydrogen Production Process Based on Experimental Permeance Data
***Y. Song**, J.K. Kim*

16 Process Modeling and Optimization of Absorption-Based CO2 Capture Process with a Low-Pressure Flash Column for the SMR-Based
***H. Park**, J. Lee, J.K. Kim, S. Yun*

17 Energetic and Economic Analysis of Natural Gas Based Hydrogen Production Processes Under Electrification
***J. Lee**, H. Park, J.K. Kim*

18 Process-Integrated Optimization of Multi-Stage Membrane Systems for Biogas Upgrading
***S.J. Kim**, J.K. Kim*

19 Financial Analysis of Low-Temperature Solar Thermal Energy Storage Systems to Supply Hot Water and Heating for Rural Colombian
*A.F. León-Esteban, **V. Kafarov**, V. Lizcano-González, K. Mahkamov*

20 Facile Determination of Antioxidant Activity of Coconut Liquor Using Cyclic Voltammetry
*K.R. Cua, K.C. Villaroman, E.P. Chan, D.A. Ng, A. Soriano, N. Dugos, **J. Ortenero***

21	Adsorption of Hexavalent Chromium from Wastewater using Microcrystalline Cellulose ***W. Mhike**, L. Dewa, S.M. Tichapondwa*
22	CAPE-based Curricula for the Improvement of Chemical Plants *A. Galeazzi, **S. Boldyryev**, A. Khussanov, G. Krajačić, F. Manenti*
23	Optimal Sizing and Energy Management in a Solar-H2 Autonomous System *E. Loukidou, D. Chousiadas, T. Damartzis, S. Papaefthimiou, **D. Ipsakis***
24	Applications of Multivariate Statistics in the Context of Life Cycle Assessment ***B.M. Köck**, M. Elser, B. Mihalyi*
25	Net Zero Smart City Vitalization Policy Plan using Automatic Parking Robot *M. Choi, D. Ku, **S. Lee***
26	Inferring solvent properties with operational data of chemical absorption system: A vapor–liquid equilibrium approach ***S. Jiang**, Y. Zhao, Z. Cheng, P. Liu, Z. Li*
27	Implementation of Robust Optimization Approach for Design of a Sustainable Dairy Supply Chain with Uncertain Environmental Costs for Treatment of the Generated in Air and Water Emissions of Pollutants ***T. Petrova**, R. Vladova, E. Kirilova*
28	Modelling, simulation and membrane wetting estimation in biogas upgrading processes using a DEA solution ***G. Pantoleontos**, D. Koutsonikolas, A. Asimakopoulou, S. Lorentzou, G. Karagiannakis*
29	Energy Management of RES-based Smart-grids with Vehicle-to-Grid Technology Integration Assessment *N. Gkiouzelis, **A. Kafetzis**, M. Bampaou, C. Ziogou, K. Panopoulos, P. Seferlis*
30	Scaling-up Of A Highly Modular Rotating Packed Bed Plant With An Efficient Solvent For Capture Cost Reduction: An Overview of the HiRECORD Project ***A. I. Papadopoulos**, P. Seferlis, N. Michailidis, F. Stergioudi, S. Papadokonstantakis, S. Spoelstra, K. Gross, R. Schulz, G. Dimitriadis, K. Intzes, I. Kougias, K. Ntrenogianni, A. Gottfroh, S. Jouenne, C. Llosa, M.*

	Demertzi, N. Anesiadou, J. Lee, J. Hendry, C. Adjiman, G. Jackson, A. Galindo, A. Haslam, R. Johnson, R. Addison, J. Raisbeck, F. Tsipa, J. Hall
31	Cost optimization of captured CO_2 liquefaction process for ship transportation *A. Psaroudas, **A. I. Papadopoulos**, P. Seferlis*
32	Kinetic features of technogenic raw material leaching in aqueous sulphuric acid solution with microwave intensification Z. Shoshay, R. Sapinov, **M. Sadenova**, P. S. Varbanov, A. Bayeva
33	The Impacts of Carbon Border Adjustment Mechanism on Carbon Emissions of Steel Industry in China ***X.C. Wang**, X.B. Dong, Y. Zhang, R. Xiao, P.S. Varbanov, Y.V. Fan*
34	LNG Regasification Terminals: LCA/Carbon Footprint Tool And Proposal For Decarbonization Solutions *C. T. Takam, A. Ghorayeb, **C. Bouallou***
35	Experimental study of Proton Exchange Membrane electrolysis system *N. Kezibri, **C. Bouallou***
36	Predictive modeling for mercury emission from subbituminous coal combustion in energy sector ***M. Marczak-Grzesik**, K. Regulski, Ł. Rauch, K. Bzowski*
37	Computational fluid dynamics simulation of a dead-end forward osmosis cell to evaluate the effect of hydrodynamics on the permeation process *S. Shahgodari, **R. Cabello**, J. Labanda, J. Llorens*

10 TUESDAY, OCTOBER 10TH

DIAS HALL (LEVEL 7)

08:30 REGISTRATION (DIAS HALL LOBBY)

SESSION 2.1

PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT

CHAIRS: **Raymond Tan, Jin Wang**

09:10 **KEYNOTE LECTURE**

Interplant Heat Integration Involving Multiple Periods of Operations with Unequal Durations

A. J. Isafiade

09:50 Optimization of Water-Energy Nexus System

***S. Prabhakar**, S. Bandyopadhyay*

10:10 A hybrid framework integrating machine-learning and mathematical programming approaches for sustainable scheduling of flexible job-shop problems

***D. Li**, T. Zheng, J. Li, A. Teymourifar*

10:30 COFFEE BREAK (DIAS HALL – LEVEL 7)

POSEIDON A+C HALL (Mezzanine), OCTOBER 10TH

SESSION 2.2

HEAT TRANSFER and HEAT EXCHANGERS

CHAIRS: **Dimitris Misirlis, Ana-Maria Cormos**

09:10 **KEYNOTE LECTURE**

Global Optimization for Shell and Tube Horizontal Thermosyphon Reboiler Design

***Z. Yang**, C. Zhu, N. Zhang, R. Smith*

09:50	Optimisation of PHE plates dimensions and corrugations geometry for condensation of steam-air mixture ***P. Kapustenko***, *L. Tovazhnyanskyy, J. J. Klemeš, O. Arsenyeva, E. Klochok, V. Ved*
10:10	Structural Topology Optimization of Metal Hydride Gyroid Container for Hydrogen Storage, M.Aziz ***L. A. Lesmana**, M. Aziz*
12:30	COFFEE BREAK (DIAS HALL – LEVEL 7)

IFIGENIA HALL (LEVEL – 1), OCTOBER 10TH

SESSION 2.3

RENEWABLE AND HIGH EFFICIENCY UTILITY SYSTEMS

CHAIRS: **Calin-Cristian Cormos, Dimitris Ipsakis**

09:10	**KEYNOTE LECTURE** Heat-Integrated Process Design of Electrified Energy Systems for Processes Industries *J. Lee, H. Park, Y. Song, S.J. Kim,* ***J. K. Kim***
09:50	Dynamic Time-Resolved Heat Pump Integration in Industrial Processes by Pinch Analysis: A Comparative Analysis of Approaches ***J. Walden**, B. Wellig, P. Stathopoulos*
10:10	Optimization of energy system of natural gas hydrate offshore platform considering wind power uncertainty, Y Wang ***X. Ma**, Y. Wang*
10:30	COFFEE BREAK (DIAS HALL – LEVEL 7)

NAFSIKA HALL (LEVEL –1), OCTOBER 10TH

SESSION 2.4

SUSTAINABLE PROCESSING AND PRODUCTION

CHAIRS: **Anton Friedl, Yasuki Kansha**

09:10	Sustainable Biomass-to-Energy Transformation: Choline Chloride-Based Deep Eutectic Solvent for Lignin Extraction and Liquefaction *E. Odita, **C. C. Yiin**, J. S. Z. Ngu, Q. Armando T., S. S. M. Lock, B. L. F. Chin, M. R. Rahman*
09:50	A comprehensive examination of alternative wine packaging from the perspective of sustainability, recycling and reusing ***Á. Csiba-Herczeg**, R. Koteczki, B. Eisingerné Balassa*
10:10	Catalytic co-gasification of biomass and waste plastic over spent LiNixCoyMn1−x−yO2 battery-modified γ-Al2O3 for enhanced hydrogen production *M. Xu, S. Hu, **X. Zhu**, L. Wu, A. Xia, Y. Huang, X. Zhu, Q. Liao*
10:30	COFFEE BREAK (DIAS HALL – LEVEL 7)

DIAS HALL (LEVEL 7), OCTOBER 10TH

PLENARY SESSION III

CHAIRS: **Michael Georgiadis, Truls Gundersen**

11:00	Game Theoretic Defense of Input-Output Systems ***K. B. Aviso***
12:00	LUNCH (Cookoo Restaurant – LEVEL 0 & DIAS HALL Veranda – LEVEL 7)

DIAS HALL (LEVEL 7), OCTOBER 10TH

SESSION 2.5

WASTE MINIMISATION, PROCESSING AND MANAGEMENT

CHAIRS: **Andrew Hoadley, Adeniyi Isafiade**

13:30	**KEYNOTE LECTURE** Environmental footprint analysis of biomass and plastic mixture co-pyrolysis: The case study of Croatia *H. Stančin, **H. Mikulčić***
14:10	The Study of Mist Flow in the Proposed Mist Flow Photocatalytic Reactor ***S. Kato**, Y. Sakai, Y. Sato, Y. Kansha*
14:30	AI application to pollution reduction and waste management toward net zero: a systematic review and mapping *F. Kuok, **M. Buntoun**, M. A. B. Promentilla*
14:50	Bandgap Tailoring of ZnO Using Metallic Sulphides for Enhanced Visible-light-active Photocatalytic Water Treatment ***R. Mugumo**, E. Ichipi, E. M. N. Chirwa, S. M. Tichapondwa*
15:10	Engineering properties and application prospects of rubber concrete pavement materials ***R. Zang**, B. Xu, K. Zhang*
15:30	COFFEE BREAK (DIAS HALL – LEVEL 7, IFIGENIA & NAFSIKA Lobby – LEVEL –1)

POSEIDON A+C HALL (Mezzanine), OCTOBER 10TH

SESSION 2.6

CO_2 CAPTURE, SEQUESTRATION AND UTILISATION

CHAIRS: **Calin C. Cormos, Mohamed Kanniche**

13:30	**KEYNOTE LECTURE** Cathode Preparation Effect on the Conversion of Captured CO_2 To Ethylene ***L. Diaz Aldana**, D. Molina Montes De Oca, K. Manian, F. Zhang, J. Klaehn, S. Paul, A. Papadopoulos, P. Seferlis, I. Tsivintzelis, F. Tzirakis*

14:10	Optimal design of Electrochemical Reduction of CO_2 in Amine-based Capture Solvents ***A. S. Kyriakides**, P. Kazepidis, G. Gkizas, P. Seferlis, L. Diaz Aldana, A. I. Papadopoulos*
14:30	Life Cycle Assessment Studies of Ethylene Production through the Electroreduction of Captured CO_2 from a Quicklime Plant ***M. A. H. Chowdhury**, K. M. N. Abdullah, M. A. Rahman*
14:50	Pilot-Scale Demonstration of CO_2 Capture with Phase-Change Solvents Under Realistic Conditions ***E. Nessi**, T. Psaroudas, P. Kazepidis, A. Papadopoulos, P. Seferlis*
15:30	COFFEE BREAK (DIAS HALL – LEVEL 7, IFIGENIA & NAFSIKA Lobby – LEVEL –1)

IFIGENIA HALL (LEVEL –1), OCTOBER 10TH

SESSION 2.7

PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT

CHAIRS: **Michael Walmsley, Zdravko Kravanja**

13:30	**KEYNOTE LECTURE** Circular Economic Models and Innovation Catalyst System for Sustainable Development *I. Viola, I.P. Borrelli, S. Esposito, **V. Sibilio***
14:10	Environmental Informatics App: Forecasting European WEEE Recycling Rate using Prophet *C. Liotiris, **Z. Andreopoulou***
14:30	Enabling Circular Practices in the Manufacturing Industry: Barriers and Challenges, S.L. Ngan ***S. L. Ngan**, P. Yatim, R. Ja'afar*
14:50	Assessing The Cost-Effectiveness Of Using Remotely Sensed Data In Agriculture For Sustainable Land Management ***M. Sadenova**, N. Beisekenov, Z. Anuarbek, T. Anuarbekov, Y. Ualiyev, N. Kulenova*

15:10	Perspectives for Implementation of the Principles of Circular Economy in Water Sector in the Industrial Region of Kazakhstan ***I. Radelyuk**, J.J. Klemeš, X. Jia, M. Yelubay*
15:30	COFFEE BREAK (DIAS HALL – LEVEL 7, IFIGENIA & NAFSIKA Lobby – LEVEL –1)

NAFSIKA HALL (LEVEL –1), OCTOBER 10TH

SESSION 2.8

ENERGY SAVING AND CLEAN TECHNOLOGIES

CHAIRS: **Robin Smith, Louis Angelo Danao**

13:30	**KEYNOTE LECTURE** Advanced Heat Pump Bridge Analysis for High-Temperature Processes ***F. Schlosser**, T. Walmsley, B. Lincoln, H. Meschede*
14:10	CFD aided investigation of a small horizontal wind turbine performance enhancement using riblets ***C. Bliamis**, Z. Vlahostergios, D. Misirlis, K. Yakinthos*
14:30	Technoeconomic Assessment of Vapor Compression and Absorption Heat Pumps for Waste Heat Recovery in CO_2 Capture Processes ***L. Poulidis**, T. Prousalis, A. Papadopoulos, P. Seferlis*
14:50	Suitability Investigation and Technical Assessment Using Multi-Criteria Decision Analysis for Offshore Wind Farms in the Philippines *P. J. Sotto, **L. A. Danao**, B. Abuan*
15:10	Techno-economic analysis of a 2MWp power system based on the integration of olive kernel pyrolysis, gasification and solid oxide fuel cell ***D. Ipsakis**, A. Lambropoulos, G. Varvoutis, E. Mandela, M. Konsolakis, G.E. Marnellos, C. Athanasiou*
15:30	COFFEE BREAK (DIAS HALL – LEVEL 7, IFIGENIA & NAFSIKA Lobby – LEVEL –1)

DIAS HALL (LEVEL 7), OCTOBER 10TH

SESSION 2.9

PROCESS INTEGRATION FOR SUSTAINABLE DEVELOPMENT

CHAIRS: **Vera Sibilio, Zacharoula Andreopoulou**

16:00 **KEYNOTE LECTURE**

A Simulation Model to Analyze the Efficacy of Plastic Waste Management Policies

C. Sy, *M. Tee*

16:40 Pinch Analysis for Solar Thermal and Industrial Process Interaction

R. Kumar Yadav, *S. Bandyopadhyay, A. Hoadley*

17:00 The Evolution of Ports into Inno Application of Multi-criteria Decision-making in the Design of a Post-disaster Transitional Shelter

R. Chan, J. Ongpeng, ***C. L. Roxas***

17:20 A Co-Production System of Cement and Methanol: Unveiling its Advancements and Potential

Y. He, *P. Liu, Z. Li*

17:40 Estimating E-commerce Plastic Waste of the Philippines through Fate Modelling

K. C. Huan, C. Martin, D. Ocampo, ***I. H. Gue***

POSEIDON A+C HALL (Mezzanine), OCTOBER 10TH

SESSION 2.10

CO_2 CAPTURE, SEQUESTRATION AND UTILISATION

CHAIRS: **Luis Diaz Aldana, Athanasios I. Papadopoulos**

16:00 **KEYNOTE LECTURE**

Decarbonising New Zealand industry through the growth of Process Integration expertise

M. Walmsley

16:40 Thermodynamic Analysis of CO_2 Absorption in Aqueous MDEA-PZ Solution using ELECNRTL and ENRTL-RK Models

A. Smahi, *O. Authier, M. Kanniche, L. Grandjean, C. Bouallou*

17:00	Investigating CO_2 Absorption in Rotating Packed Beds: Development, Validation, and Operational Analysis of a Rate-Based Model ***B. Kantouros**, P. Kazepidis, A. I. Papadopoulos, P. Seferlis*
17:20	3-Levers of Emission Control (3-LoEC)-Model: Integrated 'Cost Accounting & GHG Accounting' System and its Application for GHG Emission Calculation of Injection Molding and 3D-Printing Technologies *W. Schwaiger, **R. Sandor**, L.H. Alaoui, E. Dautaj, T. Gauß, M. Steinbacher, M. Wustinger*
17:40	CO_2 Solubility in Aqueous Solutions used in CO_2 Capture and Utilization Applications: Systems of N-Methylcyclohexylamine with Strong or Weak Bases ***F. Tzirakis**, A. I. Papadopoulos, P. Seferlis, I. Tsivitzelis*

IFIGENIA HALL (LEVEL –1), OCTOBER 10TH

SESSION 2.11

PROCESS ANALYSIS, MODELLING AND OPTIMISATION

CHAIRS: **Jin-Kuk Kim, Antonis Kokossis**

16:00	A Conditional Entropy Based Feature Selection for Soft Sensor Development in Chemical Processes ***C. Ji**, F. Ma, J. Wang, W. Sun*
16:20	A novel methodology for industrial park layout design using multi-objective optimization considering obstacle-avoiding pipe network ***Z. Cui**, Y. Wang*
16:40	Optimal Aircraft Payload Weight and Balance using Fuzzy Linear Programming Model ***J. M. Macalintal**, A. Ubando*
17:00	Smart Energy Strategy – A Comparative Study of Energy Consumption Forecasting Machine Learning Models ***A. Zafeiriou**, G. Chantzis, T. Jonkaitis, P. Fokaides, A. Papadopoulos*
17:20	Carbon Pricing Impact Evaluation on Transport Sector: A Comparative Analysis for India ***M. Patel**, R. Singh, P. Arora*, D. Mahapatra*

17:40	Prediction for Temperature Variation and Distribution under Heating Conditions Using Soft Sensing Method *F. Xu, K. Sakurai, Y. Sato, Y. Sakai, S. Sabu, H. Kanayama, D. Satou,* ***Y. Kansha***

NAFSIKA HALL (LEVEL –1), OCTOBER 10TH

SESSION 2.12

INDUSTRIAL IMPLEMENTATION AND OPTIMISATION

CHAIRS: **Hrvoje Mikulčić, Spyridon Voutetakis**

16:00	**KEYNOTE LECTURE** Modelling of RES4 industry options and energy-saving measures for polymer chemical plant ***S. Boldyryev****, M. Ilchenko, B. Kaldybaeva, G. Krajačić*
16:40	Optimization of Multi-component Refrigerant in Natural Gas Dehydrocarbon System ***K. Li****, G. Liu*
17:00	Developing Environmental, Social and Governance (ESG) Index for Palm oil industry value chain, Ngan *S. P. Ngan, H. L. Lam,* ***S. L. Ngan****, W. D. Leong*
17:20	Process integration of multi-temperature heat pumps using mathematical programming *T. Walmsley, K. Hall, A. Nemet,* ***F. Schlosser****, Z. Kravanja, M. Walmsley*
17:40	Thermal Conductivity of CMAS Slag at Nearly 2000 Kelvin: Laser-based Measurement and Machine-Learning Prediction ***J. Wu****, Q. Liu1, H. Wang, X. Zhu, Q. Liao*

POSEIDON B HALL (Mezzanine), OCTOBER 9-10TH

POSTER SESSION (ALL DAY)

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A.J. Isafiade

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***T. Chitsiga**, A.J. Isafiade*

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***Y. Song**, J.K. Kim*

16 Process Modeling and Optimization of Absorption-Based CO2 Capture Process with a Low-Pressure Flash Column for the SMR-Based

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11 WEDNESDAY, OCTOBER 11TH

DIAS HALL (LEVEL 7)

SESSION 3.1

FOOTPRINT MINIMISATION AND MITIGATION

CHAIRS: **Argyris Anagnostopoulos, Theodoros Damartzis**

09:10 **KEYNOTE LECTURE**

Energy Systems CO2 emissions reduction planning in Sarawak and Qatar using Minimum Marginal Abatement Cost Curves (Mini-MAC)

M. Lameh, J.P. Rajakal, V. Andiappan, P. Linke, ***D. Al-Mohannadi***

09:50 Shipping Emissions Impact on the Air Quality of Marseille Port Using CFD Modelling

C. Boikos*, P. Siamidis, L. Ntziachristos*, S. Oppo, A. Armengaud*

10:10 Technoeconomic assessment of recycling routes for chemicals: Case study of n-Hexane

J. Pimentel, ***G. Ruiz-Mercado****, F. Friedler*

10:30 COFFEE BREAK (DIAS HALL – LEVEL 7)

BACKYARD HALL (LEVEL 0), OCTOBER 11TH

SESSION 3.2

OPERATIONS AND SUPPLY CHAIN MANAGEMENT

CHAIRS: **Sebastian Werle, Stanislav Boldyryev**

09:10 Multi- decision-making strategies to optimize the design-operation of renewable energy-driven reverse osmosis system considering hydrogen production and demand side management

A. H. Ba-Alawi*, H.T. Nguyen, T. Woo, C. Yoo*

09:30 Modeling the vehicle routing problem with delivery and pickup in e-commerce forward-reverse logistics networks based on the triple bottom line framework

C.B. Mallari*, J.L. San Juan, M. Bongo*

09:50	Optimization of Production Scheduling in Food and Beverage Industrial Facilities **M.*E. Samouilidou***, *G.P. Georgiadis, A. Dikaiakos, M. Georgiadis*
10:10	Economic Assessment of Green Hydrogen Infrastructure: A Case Study in China ***J. Cui***, *M. Aziz*
10:30	COFFEE BREAK (DIAS HALL – LEVEL 7)

IFIGENIA HALL (LEVEL –1), OCTOBER 11TH

SESSION 3.3

SUSTAINABLE PROCESSING AND PRODUCTION

CHAIRS: **Viatcheslav Kafarov, Zinon Vlahostergios**

09:10	Decision of construction technology from a sustainability aspects, life cycle analysis based on transport and construction ***B. Eisinger Balassa***, *O. Kegyes-Brassai, L. Buics*
09:30	Generating design space for production planning problems using machine learning algorithms ***N. D. Chaturvedi***, *A. Sharthi, S. Kumar*
09:50	A Game Theoretic Approach for Plastic Life Cycle Assessment ***C. Si***, *Y. V. Fan, L. Čuček, M. Dokl, P. S. Varbanov*
10:10	Levelised Cost of Energy for High Tip-Speed Ratio Tidal Turbines Operating in Less Energetic Flows ***J. I. Encarnacion***, *C. Johnstone*
10:30	COFFEE BREAK (DIAS HALL – LEVEL 7)

NAFSIKA HALL (LEVEL –1), OCTOBER 11TH

SESSION 3.4

PROCESS ANALYSIS, MODELLING AND OPTIMISATION

CHAIRS: **Nidret Ibric, Linhuan He**

09:10	Coupling Optimization of the Distillation and Absorption Columns and Its Application in Methanol-to-Olefins Process ***N. Li**, G. Liu*
09:30	An efficient CA-FD framework to simulate the electrochemical reaction-diffusion process with complex solid-liquid boundaries ***J. Dai**, C. Zhai, Y. Dang, H. Lv, G. Yu, W. Sun, Y. Liu*
09:50	Modeling and Evaluation of CO2-based Electrothermal Energy Storage System *A. S. Kyriakides, **A. Stoikos**, D. Trigkas, G. Gravanis, I. Tsimpanogiannis, S. Papadopoulou, S. Voutetakis*
10:10	Integration of Refinery Hydrogen Network based on High Fidelity Compressor Model, M. Yang ***Y. Zhou**, M. Yang, X. Feng*
10:30	COFFEE BREAK (DIAS HALL – LEVEL 7)

DIAS HALL (LEVEL 7)

PLENARY LECTURE IV

CHAIRS: **Spyridon Voutetakis, Athanasios I. Papadopoulos**

11:00	Thermal Energy Storage Using Composite Phase Change Materials - From Materials, to Devices, and System Integration and Optimisation ***Yulong Ding***
12:00	LUNCH (Cookoo Restaurant – LEVEL 0)

DIAS HALL, OCTOBER 11TH

SESSION 3.5

PROCESS ANALYSIS, MODELLING AND OPTIMISATION

CHAIRS: **Yee Van Fan, Petro Kapustenko**

13:30 **KEYNOTE LECTURE**

Thermo-hydraulic Effects of Scaling in Flat Plate Solar Collector Networks

***H. G. Lugo Granados**, L. Canizalez-Dávalos, M. Picón Núñez*

14:10 Efficient utilization of industrial waste heat for hydrogen production via Cu-Cl thermochemical water splitting cycle

***A. Darmawan**, M. Aziz, E. Listiani Dewi, A.H. Budiman*

14:30 Economic perspectives of wheat straw biorefinery via organosolv pretreatment: A case study for bioethanol, lignin, and biogas production

***S. Abbas**, S. Serna-Loaiza, A. Friedl, S. Papadokonstantakis*

14:50 A Holistic CFD Digital Twin Model of a Real Cement Kiln

*A. Katsinos, T. Kaimakamis, **M. Mouratidis**, E. Kostarellou, T. Damartzis, vasileiosK. Michalis, A. Asimakopoulou, G. Skevis, I. Tsimpanogiannis, V. Stroungaris, N. Poulianas, M.S. Katsiotis, A. Tomboulides*

15:10 Study on the Influence of Coal on Coal-to-Ethylene Glycol Process Considering the Integration of Reactor and Heat

*D. Li, **G Liu***

15:30 A Rigorous Approach to Address Non-Uniform Heat Capacity in Pinch Analysis

***V. Chaitanya**, S. Narasimhan, V. Gadhiraju*

BACKYARD HALL (LEVEL 0), OCTOBER 11TH

SESSION 3.6

Process Optimisation for Reduced Pollution and Risks

CHAIRS: **Sheng Zhang, Petar Sabev Varbanov**

13:30 **KEYNOTE LECTURE**

Techno-economic Evaluation and Synthesis of Green Hydrogen Supply Chain with Ammonia as Energy Carrier

*P. S. Bay, V. Andiappan, C. H. Lim, M. H. Hassim, J. P. Rajakal, **D.K.S. Ng***

14:10	Determination of Locations of High Concentration of Indoor Air Pollutants Using Air Flow Measurements and Modelling *K. O. Malbas, M. K. Alfonso, R. P. Estaquio, J. Agar, J.R. Lustro, J. I. Encarnacion,* ***J. G. Reyes***
14:30	Generalised Optimisation Framework for the Synthesis of Thermally Coupled Distillation Columns in the Equation-Oriented Environment ***C. Liu****, Y. Ma, D. Zhang, J. Li, L. Sun*
14:50	A Novel Approach to Recognize Hidden Machinery Malfunctions Based on Operational Data ***G. Gravanis****, D. Trigkas, K. Diamantaras, S. Voutetakis, S. Papadopoulou*
15:10	Bottleneck-identification methodology and debottlenecking strategy for heat exchanger network with disturbance ***L. Zhao,*** *G. Liu*

IFIGENIA HALL (LEVEL –1), OCTOBER 11TH

SESSION 3.7

ENERGY SAVING AND CLEAN TECHNOLOGIES

CHAIRS: **Athanasios I. Papadopoulos, Fragkiskos Tzirakis**

13:30	**KEYNOTE LECTURE** Synthesis of Heat-Integrated Water Networks with Exergo-economic Criteria ***N. Ibrić****, T. Adams, T. Gundersen*
14:10	The Performance of a Magnus Vertical Axis Wind Turbine in Typhoon Wind Speeds *H.E. Limpot, A. Somido, A.S. Yamsuan, B. Abuan,* ***L.A. Danao***
14:30	Integration of localised renewable energy into a meat processing site ***M. Walmsley****, E. Klinac, S. Tito, M. Atkins, M. Apperley*
14:50	Soft-sensing Model Evaluation for Heterogeneous Thermal Environment in the Perspective of Predicted Mean Vote ***K. Sakurai****, F. Xu, Y. Sato, Y. Sakai, S. Sabu, H. Kanayama, D. Satou, Y. Kansha*

15:10 Application of Magnetic Phase Transition in Energy Harvesting Wireless Sensors for Body Temperature, H. Kiyomoto
***H. Kiyomoto**, Y. Sakai, Y. Sato, Y. Kansha*

15:30 Deep Learning-Guided Metaheuristics for Optimising Cascade Packed Bed Thermal Energy Storage in Waste Heat Recovery and Decarbonisation Applications
*A. Anagnostopoulos, **T. Xenitopoulos**, P. Seferlis, Y. Ding*

NAFSIKA HALL (LEVEL –1), OCTOBER 11TH

SESSION 3.8

WASTE MINIMISATION, PROCESSING AND MANAGEMENT

CHAIRS: **Kathleen Aviso, Theodoros Damartzis**

13:30 **KEYNOTE LECTURE**
Solvolysis and Oxidative Liquefaction of the End-of-Life Composite Wastes as an Element of the Circular Economy Assumptions
S. Werle

14:10 Economic Analysis of the Power to Methane Process Using a High-Temperature Molten Carbonates Electrolyzer
*D. Monzer, **C. Bouallou***

14:30 Decarbonisation Options for Rotary Kiln – Induction Furnace Process of Crude Steel Production, N. Bhardwaj
***N. Bhardwaj**, S. Seethamraju, S. Bandyopadhyay, R. Banerjee*

14:50 Footprint evaluation of household operation accounting for the use of different utility and different materials
***T. Pan**, P. Ocłoń, M. Nowak-Ocłoń, M.A. Yildirim, B. Wang, P.S. Varbanov*

DIAS HALL (LEVEL 7)

20:00 **GALA – AWARDS DINNER**

MODERATORS: **Panos Seferlis, Petar Sabev Varbanov**

AWARDS HANDLING: **Athanassios Papadopoulos, Jiří Klemeš**

GENERAL INFORMATION

Registration Procedure

Delegates may receive their registration package at the conference reception desk located at Level 7 of Mediterranean Palace Hotel between 14:00-17:00 on Sunday October 8th. The reception desk will also be open for the registration of delegates on the remaining days from 8:30 a.m. Delegates are kindly requested to wear their badges at all times during the conference and upon their entrance to the conference venue if they stay at other hotels.

Emergency Contact Numbers

The emergency number for all purposes in Greece is 112 (free of charge from mobile phones). In case of an emergency notify the conference reception desk.

Wireless Internet

Free wireless Internet access is provided for all conference attendants in all conference lecture halls and common areas of the hotel. Select wi-fi network “Mediterranean Palace” and enter as password “mp240220”.

Food & Beverage

Refreshments and light snacks during the coffee breaks (DIAS Hall – Level 7) and lunches (Cookoo Restaurant – Level 0 or DIAS Hall Veranda) are included in the registration fee. The delegates should show their badges before their entrance into the Hotel’s Restaurant.

Instructions to Session Chairs

- Please take a moment to identify the session you are chairing and find 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 meet 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 and become familiar with the presentation space and the audio/visual equipment in the room.

- Keynote lectures are allocated up to 35 minutes for the presentations followed by 5 – 10 minutes for questions by the audience.

- Regular presentations are allocated 15 minutes for the presentation followed by 5 minutes for questions by the audience.

- All presenters are kindly asked to keep the time frame allocated so that participants can follow the lecture programme.

- Session chairs have been given instructions for the strict regulation of the time schedule. Presenters will be given a two minutes warning by the session chairs.

Instructions to Poster Presenters

- The poster stands have dimensions of 95 cm x 178 cm. A0 poster size appears to be ideal. Each stand will have a tag indicating the poster number. Organizers will provide the material for placing the posters on the stands.

- Poster presenters can place their posters on the stands after 9:00 a.m. on Monday and Tuesday.

Prizes and Awards

PRES conferences have established a tradition of selecting the best 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'23 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 Awards Dinner on Wednesday October 11th. Only personally presented winners will be awarded. In addition, the Best Paper "Jiří J. Klemeš" Award will be presented on October 9th.

Transportation

Transportation from the Makedonia International Airport (SKG) to Thessaloniki city centre is possible by public bus withn an express line (2.0 € per person) or taxi (about 30 € - taxi can accommodate up to 3 people depending on their luggage). Bus routes from the airport run every hour.

Mediterranean Palace Hotel is located in the down town area just 50 metres from the seaside promenade of the city and within walking distance from all major sightseeing places.

Social Programme

A boat cruise around the gulf of Thessaloniki will take place on Tuesday evening at 19:00. Departure from White Tower Seafront Area. One complementary bottle of beer or refreshment is included.

The Welcome Party will take place at the balcony area of the DIAS Hall (Level 7) of Mediterranean Palace Hotel 20:00 until 23:00. Light snacks and drinks will be offered to all conference attendants.

The Conference Gala-Awards dinner will take place at the DIAS Hall (Level 7) of Mediterranean Palace Hotel 20:00 until 24:00. Invitations to the dinner are included in the registration package for full-rate participants. A gourmet dinner and excellent local wines will set the background for a relaxed evening to reflect on the scientific endeavours presented at the conference. The PRES'23 Best Poster Presentation Awards will be presented during the Gala-Awards Dinner.

MEDITERRANEAN PALACE HOTEL
FLOOR PLANS

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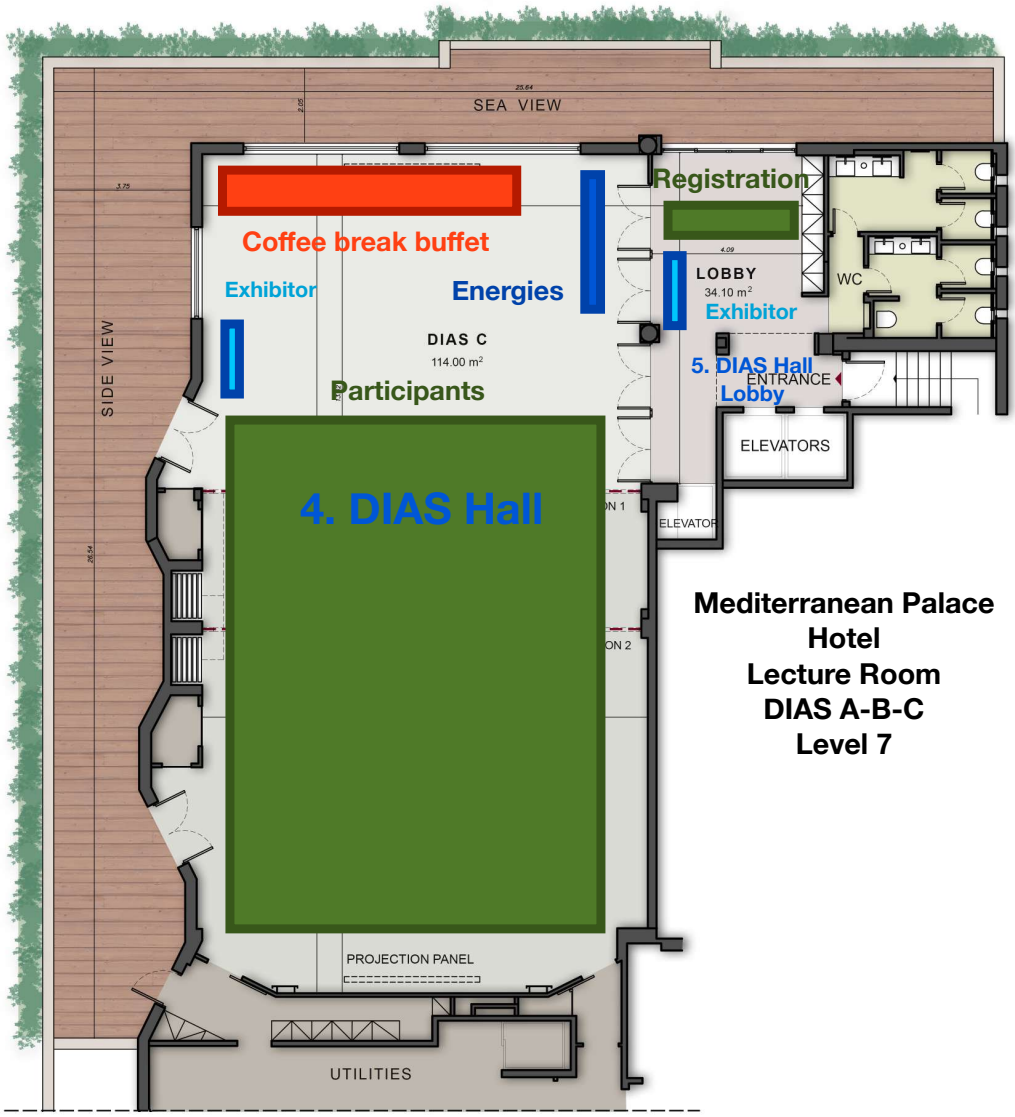
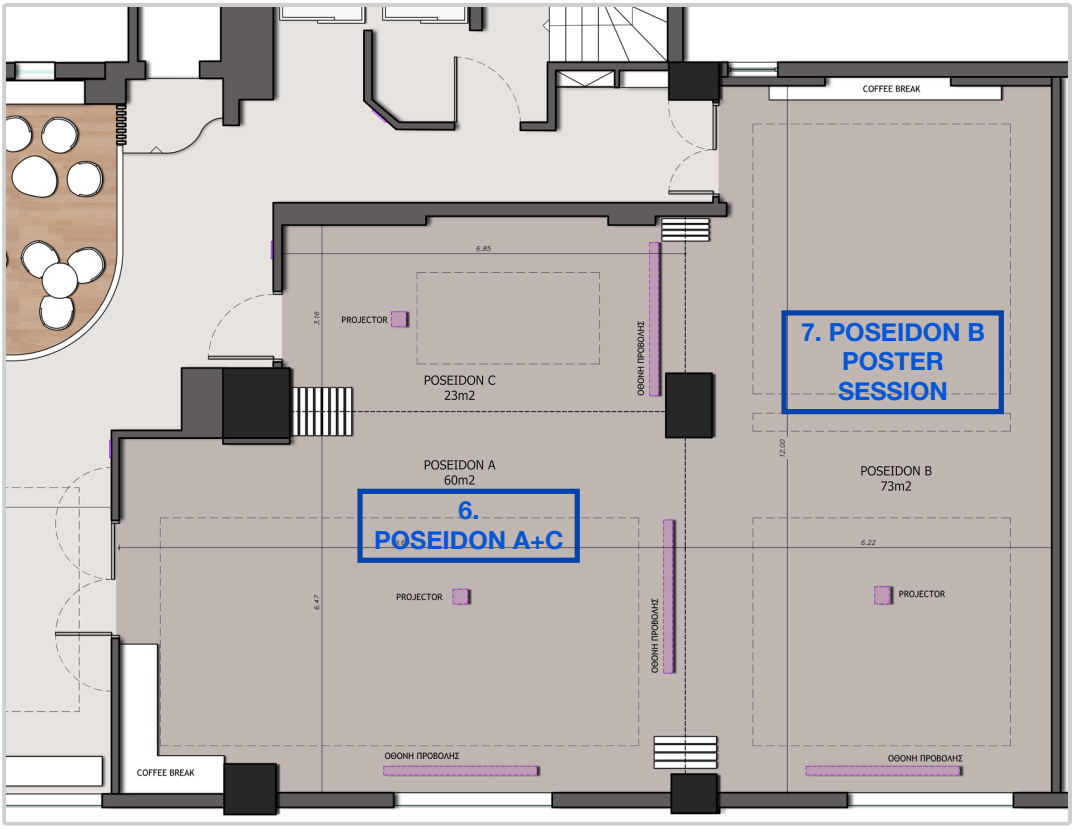


DIAS Hall – Level 7 Schematic



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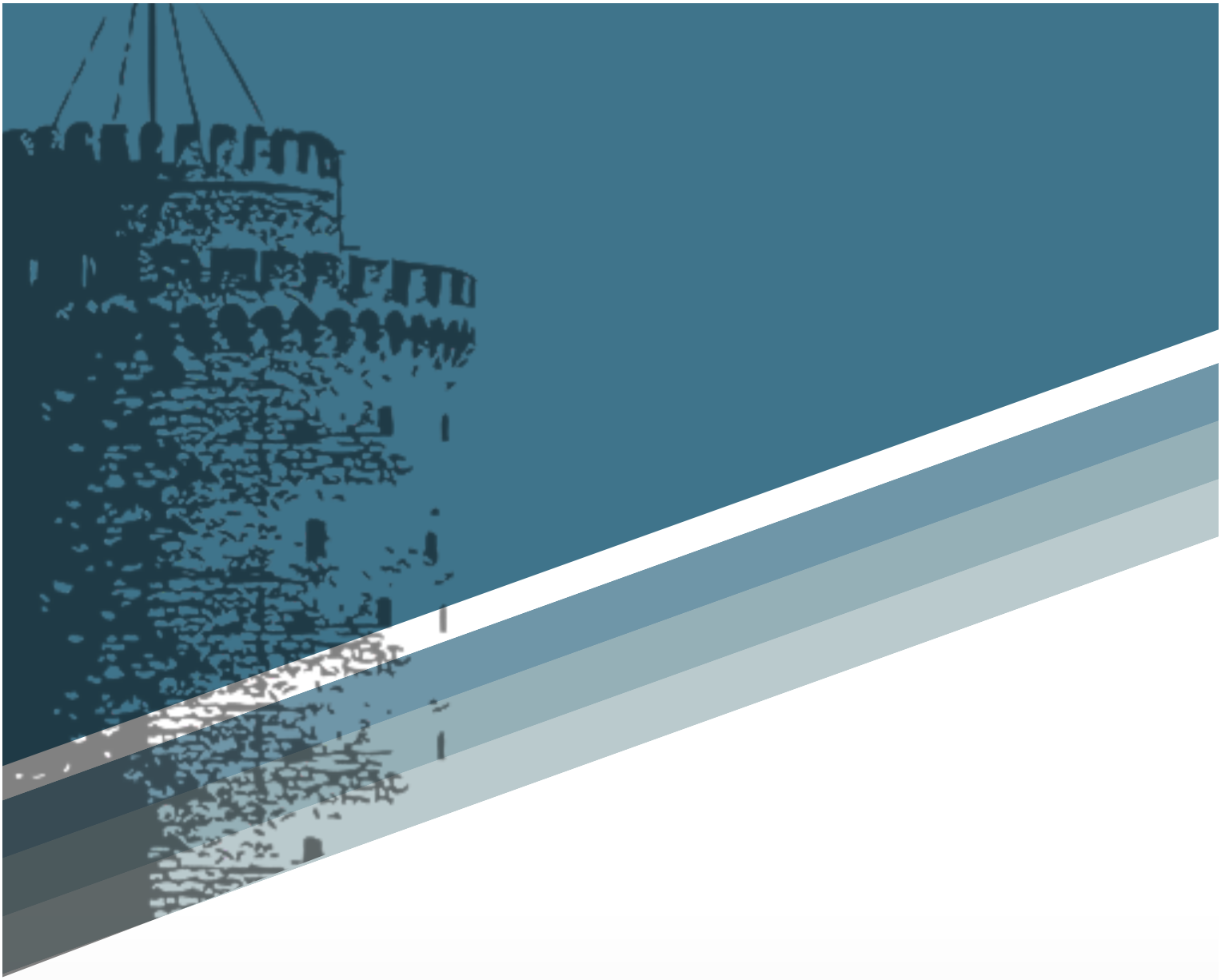
Zhu X.	S2.4/10:10



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

SPIL Sustainable Process Integration Laboratory – NETME

FME Faculty of Mechanical Engineering,
Brno University of Technology