

# PRES'19

## 22<sup>ND</sup> CONFERENCE

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



AUTH



CPERI



October 20-23, 2019  
Crete, Greece

# PRES'19

## WELCOME

PRES'19 International Scientific and Organisation Committees welcome all participants to the twenty-second event in the series of PRES conferences in Agios Nikolaos, Crete, Greece. The PRES conference series began in 1998 in collaboration with the late Professor Zdeněk Buránek within the framework of the CHISA congresses and became established in the annual scientific calendar by the joint conference PRES'99 with ESCAPE-9 in collaboration with Hungarian colleagues in Budapest in 1999. A 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 proceedings in a dedicated volume of Chemical Engineering Transactions (cited by SCOPUS and for a period also in Web of Science). With a growing global presence, PRES events have become independent and visited countries where strong communities in Process Integration, modelling, and optimisation have developed – such as Kuching, Malaysia in 2015 and Tianjin, China in 2017.

PRES returns to Greece in 2019 after a successful event in 2013 on the island of Rhodes. 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'19 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 480 abstracts, authored by more than 1200 researchers from 49 countries. Of these, 319 papers were selected by the International Scientific Committee for inclusion in the final programme, which includes three plenary lectures from leading scientists in the field of Process Integration and Industrial Ecology, 30 keynote presentations, 144 oral presentations, and 146 poster presentations. All papers have undergone a thorough peer-review process to ensure the highest technical quality, assisted by 106 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 23<sup>rd</sup>. Selected papers from PRES'19 are published in Volume 76 of Chemical Engineering Transactions, 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 2018: 6.395), Energy (IF 2018: 5.537), Renewable and Sustainable Energy Reviews (IF 2018: 10.556), Energies (IF 2018: 2.707, Open Access), Sustainability (IF 2018: 2.592, Open Access), and Energy & Environment (IF 2018: 1.092).

PRES'19 in Crete, 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

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first time, the welcome reception party on Sunday, October 20<sup>th</sup> sets the stage for the commencement of the scientific dialogue and friendly conversations. The daily coffee and lunch breaks not only immerse participants in traditional Cretan cuisine but mainly enable the continuation of discussions initiated during the technical sessions. The Conference Gala-Awards dinner planned for the evening of Wednesday, October 23<sup>rd</sup> promises to conclude PRES'19 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.

Crete is a place that offers exquisite landscapes and excellent climate even at mid-autumn. However, two elements make Crete an incredible destination. Crete's history of human presence and unprecedented achievements for over 5,000 years, and today's Cretans – a hospitable, proud, and independent group of people extending the glorious long history of the island. Conference participants are encouraged to explore the ancient and medieval past of the island, wander in the cosmopolitan cities and the isolated picturesque villages, each one offering a unique character and enjoy friendship with the locals over a delicious meal.

PRES'19 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'19 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 at VUT for all their hard work for the preparation of the Conference.

**Jiří Jaromír Klemeš,**  
*PRES Conferences President*

**Panos Seferlis, Spyridon Voutetakis, Petar Sabev Varbanov, Timothy Gordon Walmsley**  
*PRES'19 Chairs*

# ABOUT **PRES SERIES**

PRES'19 is the twenty-second event in the series. It was initiated by Professor Jiří J Klemeš with the late Professor Zdenek Burianek in the framework of CHISA conferences.

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
20	2019	Agios Nikolaos, Crete	Greece

# TOPICS

## CONFERENCE FORMAT

PRES'19 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
  - 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
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### Special Sessions

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- SPIL Symposium
  - P-graph: Development, Applications, and Optimisation
  - Sustainable Mobility
  - CO<sub>2</sub> capture and utilisation
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# INTERNATIONAL SCIENTIFIC COMMITTEE

## PRESIDENT

J. J. Klemeš	Brno University of Technology – VUT	CZ
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P. Seferlis	Aristotle University of Thessaloniki	GR
S. Voutetakis	Centre for Research and Technology - Hellas	GR
T. G. Walmsley	Brno University of Technology - VUT	CZ
P. S. Varbanov	Brno University of Technology - VUT	CZ

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S. Wan Alwi	Universiti Teknologi Malaysia	MY
X.-G. Yuan	Tianjin University	CN

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N. Duić	University of Zagreb	HR

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<b>M. Emtir</b>	Libyan Petroleum Institute	LY
<b>X. Feng</b>	Xi'an Jiaotong University	CN
<b>D. C. Y. Foo</b>	University of Nottingham, Malaysia	MY
<b>A. Friedl</b>	T. U. Wien	AT
<b>T. Gundersen</b>	Norwegian University of Science and Technology	NO
<b>M. Gough</b>	CALGAVIN Ltd	UK
<b>S. Harvey</b>	Chalmers University	SE
<b>A. Hoadley</b>	Monash University	AU
<b>A. Josceanu</b>	University Politehnica of Bucharest	RO
<b>V. Kafarov</b>	Universidad Industrial de Santander	CO
<b>P. Kapustenko</b>	National Technical University	UA
<b>E. Kenig</b>	Universitaet Paderborn	DE
<b>J.-K. Kim</b>	Kyung Hee University	KR
<b>Z. Kravanja</b>	University of Maribor	SI
<b>D. Kukulka</b>	Buffalo State College (SUNY)	US
<b>J. Labidi</b>	University of the Basque Country	ES
<b>V. Lavric</b>	University Politehnica of Bucharest	RO
<b>C. T. Lee</b>	Universiti Teknologi Malaysia	MY
<b>P. Liu</b>	Tsinghua University	CN
<b>X. Liu</b>	Sinopec China	CN
<b>H. Lund</b>	Aalborg University	DK
<b>Z. Manan</b>	Universiti Teknologi Malaysia	MY
<b>F. Manenti</b>	Politecnico di Milano	IT
<b>F. Marechal</b>	École Polytechnique Fédérale de Lausanne	CH
<b>K. Matsuda</b>	Institute of Applied Energy	JP
<b>A. Mészáros</b>	Slovak University of Technology	SK
<b>D. Misirlis</b>	International Hellenic University	GR
<b>I. M. Mujtaba</b>	Bradford University	UK
<b>A. Nemet</b>	Maribor University	SI
<b>S. Nižetić</b>	University of Split	HR
<b>Z. Novak Pintarič</b>	University of Maribor	SI
<b>N. Ozalp</b>	University of Minnesota Duluth	US
<b>A. I. Papadopoulos</b>	Centre for Research and Technology - Hellas	GR
<b>S. Perry</b>	The University of Manchester	UK
<b>M. Picón-Núñez</b>	University of Guanajuato	MX
<b>A. E. Pleșu</b>	University of Barcelona	ES
<b>A. Reverberi</b>	Universita' di Genova	IT
<b>L. Savulescu</b>	Natural Resources Canada	CA
<b>S. K. Sikdar</b>	Retired from US EPA	US
<b>R. Smith</b>	The University of Manchester	UK

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<b>R. R. Tan</b>	De La Salle University	PH
<b>K. Urbaniec</b>	Warsaw University of Technology	PL
<b>M. R. W. Walmsley</b>	University of Waikato	NZ
<b>Q. W. Wang</b>	Xi'an Jiaotong University	CN
<b>Y. Wang</b>	China University of Petroleum	CN
<b>J. Yan</b>	Royal Institute of Technology, Stockholm	SE
<b>F. You</b>	Cornell University	US
<b>S. B. Yusuf</b>	Universiti Teknologi Petronas	MY

# LOCAL ORGANISING COMMITTEE

## CHAIRS

<b>P. Seferlis</b>	Aristotle University of Thessaloniki	GR
<b>S. Voutetakis</b>	Centre for Research and Technology - Hellas	GR

## MEMBERS

<b>D. Misirlis</b>	International Hellenic University	GR
<b>Z. Vlahostergios</b>	Democritus University of Thrace	GR
<b>A. I. Papadopoulos</b>	Centre for Research and Technology - Hellas	GR
<b>K. Panopoulos</b>	Centre for Research and Technology - Hellas	GR
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<b>S. Bezergianni</b>	Centre for Research and Technology - Hellas	GR
<b>S. Balomenou</b>	Centre for Research and Technology - Hellas	GR
<b>D. Tsiplakides</b>	Aristotle University of Thessaloniki	GR

# PLENARY SPEAKERS

## ZDRAVKO KRAVANJA

Faculty of Chemistry and Chemical Engineering, University of Maribor

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### **Sustainable Systems Synthesis and Optimization for Efficient Utilization of Resources and Reduction of Greenhouse Gas Emissions**



Among the main problems of the modern society are depletion of resources, waste management, linear supply chains and unsustainability of systems in general. One of the ultimate goals from the systems viewpoint would be to develop and implement a holistic approach to sustainable systems synthesis and optimization in order to increase the efficiency of resources utilization, while simultaneously mitigate greenhouse gas (GHG) emissions as well as significantly lower waste disposal. Thermodynamic analysis of European Union energy sectors will be presented to show energy-saving potential as well as the potential for related GHG emissions reduction. The role of mathematical programming (MP) approach to systems synthesis and optimization will be discussed in order to design more advanced systems with respect to achieving significant utility and, hence, emission reduction. Two aspects of MP will be discussed, the first one being the underlying software development, especially the development of mixed-integer programming process synthesizer MIPSYN-Global, and the second one MP applications for which different case studies will be shown to illustrate the efficiency of applying MP in regards to design more sustainable systems, including the synthesis of continental renewable-based supply networks for producing food, biofuels and electricity, applied to European Union. The results from thermodynamic analysis and example problems clearly indicate significant potential for GHG emission reduction and that the necessary transition away from fossil-based production could be carried out in a sustainable way in relatively short period of time.

Zdravko Kravanja is a Professor and the Dean in the Faculty of Chemistry and Chemical Engineering at the University of Maribor, Slovenia. He joined the university after several years in industry (1981-1985). He was Visiting Researcher (1988-89) and Visiting Professor at Carnegie Mellon University, US (1997), and Guest Professor at Danmarks Tekniske Universitet, Lyngby on several occasions (from 1998 on). He was awarded Pannonia Award in 2015 and Slovenian state price - Zois award for excellence in science in 2017. He was President of the Slovenian Academic Association for Engineering and Natural Sciences (SATENA) (2010-2011). He has recently become an associate member of Slovenian Academy of Engineering. His research over the years has been devoted mainly to the development of algorithmic techniques, strategies, and computerised tools for sustainable Process Systems Engineering, including Heat and Water Integration. Together with Professor Grossmann, he has developed a unique mixed-integer process synthesizer shell called MIPSYN. His recent research has been oriented towards the synthesis of sustainable systems, e.g. renewable-based biofuel supply networks, using multi-objective optimization and monetary-based sustainability measurements, sustainability profit and sustainability net present value. He has (co-)authored around 170 publications in scientific journals.

## SHARIFAH R. WAN ALWI

School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia

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### Centralised Large-Scale Water Demand Planning and Management Across Industrial Sites



Water is extensively used in agriculture, industry and domestic sectors worldwide. Clean water supply is becoming increasingly scarce due to rising water demand as a result of the growing global population, rapid industrialisation and widespread water pollution. Even though water conservation through behavioural change can be achieved at no cost, its scale and impact can be limited due to the challenges of managing human behaviour. Engineering efficient water utilisation systems via proper planning, design and management can help minimise water usage more sustainably, and contribute to achieving water security. Grey water reuse has long been introduced, while systematic techniques to maximise water recovery within a facility has been established via methods such as Water Pinch Analysis or mathematical modelling. Water minimisation can be effectively achieved by holistically exploring water minimisation options such as elimination, reduction, reuse/recycling, outsourcing and regeneration according to the Water Management Hierarchy. In this lecture, a framework for the centralised planning and design of large scale water exchange across multiple industrial sites is introduced to holistically and efficiently manage water demand and address issue of water supply scarcity. The mechanism, business model, economics, opportunities as well as challenges of large scale water exchange across Total Site are addressed to ensure its practical and cost-effective implementation.

Sharifah Rafidah Wan Alwi is the Director of Process Systems Engineering Centre (PROSPECT) of Universiti Teknologi Malaysia (UTM). She has been extensively involved in more than 80 R & D and consultancy projects involving various industries and government agencies, and has trained engineers from more than 200 companies in the field of sustainable systems planning, design and engineering. She specialises in process systems engineering with emphasis on resource conservation. Sharifah is currently the Associate Editor for Journal of Cleaner Production, and an Editorial Board member for Applied Thermal Engineering Journal and the International Journal of Higher Education and Sustainability. She has more than 200 publications, filed for 14 patents, 22 copyrights and developed 5 software products. Sharifah is a co-founder of Optimal Systems Engineering (OPTIMISE), a UTM Spin-off company. She has received numerous international awards such as the Germany Green Talents Award (2009), the IChemE Highly Commended Sir Frederick Warner Prize (2011), the ASEAN Young Scientist and Technologist Award 2014, the Malaysia Young Scientist Award 2015, the Most Exalted Order of Sarawak Medal (2015), the Runner-up for ASEAN-US Science Prize for Women (2016), the Malaysia Research Star Award (2016 and 2018) and Top Research Scientist Malaysia (2018). She has served as the Chairman for Malaysia IChemE Young Engineer Group (YEG), and is a member of Young Scientist Network, Academy of Sciences Malaysia (YSN-ASM).

## YUTAO WANG

Department of Environmental Science and Engineering, Fudan University

### **Ecological Capital: Concept, Measurement and Governance**



Nature as capital is essential for human well-being, and it provides not only direct products but also indirect services. It is essential to assess the value of nature in both physical and monetary values for sustainable development. New concepts and methods have emerged since 1990s. The integration of different methods has attracted increasing academic attention. The progress, advantages, and limitations of different methods will be introduced in this talk, including SEEA, ecological footprint, exergy, emergy, LCA, and economic valuation approaches, as well as newly developed modelling approaches. Also, climate change has a significant impact on the stocks, flows, and distribution patterns of ecological capital, which in turn has a significant impact on social well-being. The uncertainty of future climate change exacerbates this impact, thus, to assess the impact of climate change on ecological capital is very necessary. In this lecture, concept, evaluation methods and different paradigms of policy instruments on ecological capital would be introduced together with a few case studies. It also intends to address ecological capital from its spatial transfer and network metabolism perspective under the context of climate change. Finally, it would also draw existing challenges in current research and identify potential gaps for the future.

Yutao Wang is a professor in the Department of Environmental Science and Engineering, Fudan University. He is currently serving as Co-Editor-in-Chief of Journal of Cleaner Production, the Executive Director of Fudan Tyndall Center, and the Deputy Director of Industrial Ecology Committee of Ecological Society of China. He is also a visiting professor at the Universit of East Anglia who has been awarded the Newton Advanced Fellow by British Academy and the Newton Fund. He is also the elected chair for Chinese Society of Industrial Ecology (2019-2020). Prior to that, he had performed research at leading research institutions such as the Oak Ridge National Lab, the University of Tennessee, Lund University, and Shandong University. He has research interests in climate change, cleaner production, industrial ecology, and ecological capital. He is devoting to study the climate adaptation strategy and pathway to accelerate the transition to post fossil carbon society by using system approach. He has published over 60 research papers in the leading journals and received over 20 research grants from different funding bodies. He also serves as the editorial board member of Journal of Environmental Accounting and Management, Chinese Journal of Environmental Management, and Chinese Journal of Population Resources and Environment (Taylor & Francis).

## SUPPORTED BY



**elpedison**



**Altair**



## ACKNOWLEDGEMENTS

The Local Organising Committee gratefully thanks the following personnel and collaborators of the Process Systems Design and Implementation Laboratory (PSDI) of CPERI/CERTH and the Machine Dynamics Laboratory of AUTH, Gianna Dourou, Athina Giannopoulou, Alexandros Kafetzis, Akrivos Kakambegas, Evgenios Karasavvas, Panagiotis Kazepidis, Kostas Koutroulis, Lily Lahanou, Dimitris Trigkas, Fragkiskos Tzirakis, Nikos Vasilas, Alexia Vouetaki, for their devotion to the preparation of PRES'19 Conference.

The International Scientific Committee would like to gratefully express thanks to the 106 expert reviewers who have helped in successfully completing the peer review process for the Chemical Engineering Transactions volume and the PRES'19 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 SPIL Symposium, enhancing the PRES'19 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.

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CONFERENCE HALL					
TIME	ARCHIMEDES	DEMOCRITUS	EUCLID	THALES	PYTHAGORAS
<b>20</b>	<b>SUNDAY, OCTOBER 20<sup>TH</sup></b>				
17:00	REGISTRATION (Reception – Conference Centre)				
19:00	WELCOME PARTY (Swimming Pool Area)				
<b>21</b>	<b>MONDAY, OCTOBER 21<sup>ST</sup></b>				
8:00	REGISTRATION (Reception – Conference Centre)				
9:00	<b>OPENING SESSION</b>				
9:30	<b>PLENARY SESSION I</b>				
10:30	COFFEE BREAK (Veranda)				
11:00	<b>Session 1.1</b> SPIL SYMPOSIUM	<b>Session 1.2</b> SUSTAINABLE AND CIRCULAR SYSTEMS	<b>Session 1.3</b> SOLAR ENERGY	<b>Session 1.4</b> CLEANER PRODUCTION	POSTER SESSION I
13:00	LUNCH (Pangea Restaurant)				
14:10					POSTER SESSION I
15:00	<b>Session 1.5</b> SYNTHESIS	<b>Session 1.6</b> OPTIMISATION	<b>Session 1.7</b> CHEMICALS	<b>Session 1.8</b> POWER SYSTEMS	POSTER SESSION I
16:40	COFFEE BREAK (Veranda)				
17:00	<b>Session 1.9</b> EMISSIONS	<b>Session 1.10</b> RENEWABLES AND STORAGE	<b>Session 1.11</b> WASTE TO ENERGY	<b>Session 1.12</b> CONTROL	POSTER SESSION I
<b>22</b>	<b>TUESDAY, OCTOBER 22<sup>ND</sup></b>				
9:00	<b>PLENARY SESSION II</b>				
10:00	COFFEE BREAK (Veranda)				
10:30	<b>Session 2.1</b> SPIL SYMPOSIUM	<b>Session 2.2</b> HEAT TRANSFER	<b>Session 2.3</b> BIOENERGY	<b>Session 2.4</b> WASTE UTILISATION	POSTER SESSION II
12:30	LUNCH (Pangea Restaurant)				

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<b>13:40</b>					POSTER SESSION II
<b>14:30</b>	<b>Session 2.5</b> PROCESS INTEGRATION	<b>Session 2.6</b> HEAT TRANSFER	<b>Session 2.7</b> BIOENERGY	<b>Session 2.8</b> WORK AND HEAT INTEGRATION	POSTER SESSION II
<b>16:10</b>	COFFEE BREAK (Veranda)				
<b>16:30</b>	<b>Session 2.9</b> PROCESS INTEGRATION	<b>Session 2.10</b> RENEWABLE ENERGY AND UTILITY SYSTEMS	<b>Session 2.11</b> ENERGY PLANNING	<b>Session 2.12</b> SEPARATION PROCESSES	POSTER SESSION II
<b>23</b>	<b>WEDNESDAY, OCTOBER 23<sup>RD</sup></b>				
<b>9:00</b>	<b>PLENARY SESSION III</b>				
<b>10:00</b>	COFFEE BREAK (Veranda)				
<b>10:30</b>	<b>Session 3.1</b> SPIL SYMPOSIUM	<b>Session 3.2</b> ENERGY STORAGE	<b>Session 3.3</b> BIOENERGY	<b>Session 3.4</b> ENERGY SYSTEMS	<b>Session 3.5</b> WATER AND WASTEWATER MANAGEMENT
<b>12:30</b>	LUNCH (Pangea Restaurant)				
<b>13:40</b>	<b>Session 3.6</b> SPECIAL SESSION: CO <sub>2</sub> CAPTURE AND UTILISATION	<b>Session 3.7</b> PROCESS INTEGRATION	<b>Session 3.8</b> POWER GENERATION	<b>Session 3.9</b> ENERGY PLANNING	<b>Session 3.10</b> WATER AND WASTEWATER MANAGEMENT
<b>15:40</b>	COFFEE BREAK (Veranda)				
<b>16:00</b>	<b>Session 3.11</b> MATERIALS	<b>Session 3.12</b> SYSTEM ANALYSIS	<b>Session 3.13</b> ENERGY MODELLING	<b>Session 3.14</b> ENERGY DESIGN AND OPTIMISATION	<b>Session 3.15</b> SUSTAINABLE PROCESSING
<b>20:30</b>	GALA AWARDS DINNER (Conference Centre)				

# PROGRAMME

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SUNDAY, OCTOBER 20<sup>TH</sup>

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- 17:00 Registration (Reception Hall – Conference Centre)  
19:30 Welcome Party (Swimming Pool Area – 3<sup>rd</sup> level)
- 

21

MONDAY, OCTOBER 21<sup>ST</sup>

ARCHIMIDES – DEMOCRITUS – EUCLID HALL

- 
- 8:00 Registration (Reception Hall – Conference Centre)  
9:00 Opening Session  
CHAIR: **Panos Seferlis**  
Welcome address  
**Antonios Zervos**, Mayor of Agios Nikolaos  
Welcome address  
**Efstratios Stylianides**, Vice-Rector Research AUTH  
Welcome Address  
**Spyridon Voutetakis**, Director CPERI/CERTH  
Welcome and PRES Conference Overview  
**Jiří Jaromír Klemeš**, PRES President
- 

PLENARY LECTURE I

CHAIRS: **Panos Seferlis, Timothy G. Walmsley**

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- 9:30 Sustainable Systems Synthesis and Optimization for Efficient Utilization of Resources and Reduction of Greenhouse Gas Emissions  
**Zdravko Kravanja, Lidija Čuček, Andreja Nemet, Žan Zore**  
10:30 COFFEE BREAK (Veranda)
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## ARCHIMIDES HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.1

#### SPIL SYMPOSIUM

CHAIRS: Jiří Jaromír Klemeš, Xuexiu Jia

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11:00

#### KEYNOTE LECTURE

Heat Exchanger Network Retrofit Considering Physical Distance, Pressure Drop and Available Equipment Space

*Y.Q. Lai, S.R. Wan Alwi, Z. Abdul Manan*

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11:40

Data Extraction for Heat Integration and Total Site Analysis: A Review

*P.S. Varbanov, J.Y. Yong, J.J. Klemeš, H.H. Chin*

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12:00

Integrating Hydrogen Turbines into Refinery Hydrogen Network for Power Recovery

*X. Liu, J. Liu, C. Deng, J.-Y. Lee, R. Tan*

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12:20

Municipal Solid Waste Container Location base on Walking Distance and Distribution of

*V. Nevrly, R. Šomplák, L. Khýr, V. Smejkalová, J. Jadrný*

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12:40

Strategic Multi-Stage Planning of Waste Processing Infrastructure

*J. Kudela, R. Šomplák, V. Nevrly*

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13:00

LUNCH (Pangea Restaurant)

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## DEMOCRITUS HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.2

#### SUSTAINABLE AND CIRCULAR SYSTEMS

CHAIRS: Ferenc Friedler, Fengqi You

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11:00

Determining the Causality between Drivers of Circular Economy using the Dematel Framework

*I.H. Gue, A.T. Ubando, M.A.B. Promentilla, R.R. Tan*

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11:20

Circular Sustainability Optimisation Model for Diverse Oil Crops Feedstock System via Element Targeting Approach

*C. Hsion, W.W.Z. Chuen, J.Q. Foo, T.J. Tan, B.S. How, W.P.Q. Ng, H.L. Lam*

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11:40

Sustainable Energy Transition toward Renewable Energies in the New Zealand Dairy Industry: An Environmental Life Cycle Assessment

*A.H. Tarighaleslami, S. Kambadur, J.R. Neale, M.J. Atkins, M.R.W. Walmsley*

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22<sup>ND</sup> CONFERENCE PROCESS INTEGRATION, MODELLING  
OPTIMISATION FOR ENERGY SAVING AND POLLUTION REDUCTION

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12:00	Stochastic Supply Chain Optimization with risk management <i>N. Suchartsunthorn, K. Siemanond</i>
12:20	<b>KEYNOTE LECTURE</b> An Optimization Model for Circular Economy Planning <i>R. Tan, K. B. Aviso, A. S. F. Chiu, I. H. Gue, J.-Y. Lee, M.-L. Tseng, A. T. Ubando</i>
13:00	LUNCH (Pangea Restaurant)

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## EUCLID HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.3

#### SOLAR ENERGY

CHAIRS: **Jalel Labidi, Dimitrios Misirlis**

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11:00	Multi Objective Optimisation of Flat Plate Solar Collector-Networks <i>J. R. Lizárraga-Morazán, G. Martínez-Rodríguez, A. L. Fuentes-Silva, M. Picón-Núñez</i>
11:20	High Renewable Energy (Solar Photovoltaics and Wind) Penetration Hybrid Energy Systems for Deep Carbonization in Philippine Off-Grid Areas <i>J. D. A. Pascasio, E. A. Esparcia Jr., C. M. F. Odulio, J. D. Ocon</i>
11:40	<b>KEYNOTE LECTURE</b> Synthesis of Solar Thermal Network for Domestic Heat Utilization <i>B. Abikoye, L. Čuček, A. J. Isafiade, Z. Kravanja</i>
12:20	Numerical Investigation of the Temperature Distribution in PCM-Integrated Solar Modules Planning <i>M. Grabo, D. Weber, A. Paul, T. Klaus, W. Bermpohl, S. Krauter, E. Y. Kenig</i>
12:40	Cost Saving Potential of Grid-Tied Solar Photovoltaic base Hybrid Energy System in the Philippine Industrial Sector <i>P. G. Jara, M. Castro, E. Esparcia Jr., C. M. Odulio, J. Ocon</i>
13:00	LUNCH (Pangea Restaurant)

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## THALES HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.4

#### CLEANER PRODUCTION

CHAIRS: **Sandro Nižetić, Rozália Lakner**

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11:00	Resource Integration and CO <sub>2</sub> Conversion in Industrial Clusters <i>S. I. Shehab, R. O. Ahmad, D. M. Al-Mohannadi, P. Linke</i>
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11:20	<b>KEYNOTE LECTURE</b> Integration of Analytic Network Process in Adaptive Lean and Green Processing <i>W. D. Leong, B. S. How, S. Y. Teng, S. L. Ngan, W. P. Q. Ng, C. H. Lim, H. L. Lam, C. P. Tan, S. G. Ponnambalam</i>
12:00	The Cr(VI) Bioremediation Potential of Chlamydomonas Debaryana <b>M. M. Roestorff, N. C. Mbonambi, E. M. N. Chirwa</b>
12:20	Towards GHG Emissions Neutrality of Aluminium Slug Production: An Industrial Study <b>R. Gomilšek, L. Čuček, M. Homšák, Z. Kravanja</b>
12:40	Ternary Ag/AgCl/BiOCl Synthesis and the Effect of its Constituents on Phenol Degradation <b>D. O. Adenuga, S. M. Tichapondwa, E. M. N. Chirwa</b>
13:00	LUNCH (Pangea Restaurant)

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## PYTHAGORAS HALL, OCTOBER 21<sup>ST</sup>

### POSTER SESSION I

- 
- 01 Computational Method Study on Drag Coefficient of Butterfly Porous Fence  
*Z. Duan, Z. Lan, J. Su, K. Wang, C. Zhou, J. Zhang*
  - 02 Use of Acidophilic Bioprospected Microalgae with Industrial Off-Gas Emissions for The Production of Biodiesel  
*S. M. Desjardins, W. Quesnel, S. Muinonen, C. A. Laamanen, J. A. Scott*
  - 03 Synthesis of Block Ceramic Catalyst Carriers Based on Natural Raw Materials and Metallurgical Slags  
*M. E. Utegenova, M. A. Sadenova, J. J. Klemeš*
  - 04 Immobilized Laccase for Sustainable Technological Processes  
*M. Primožič, K. Vasić, G. Kravanja, Ž. Knez, M. Leitgeb*
  - 05 Mining Technologies for Deep Mines: Strategies for Increased Productivity and Long-Term Economic and Environmental Sustainability  
*K. Moreau, R. Bose, H. Shang, John A. Scott*
  - 06 Nonlinear Finite Element Analysis-Based Flow Distribution Model for Engineering Practice  
*T. Létal, V. Turek, D. Fialová*
-

- 07 Modelling the Motion of a Single Solid Bead in a Newtonian Fluid by Two-Phase CFD Methods  
*L. Gyurik, A. Egedy, Z. Ulbert, K. Cronin, D. Ring*
- 08 Energy Analysis of an Industrial Nozzle with Variable Outlet Conditions During Compressible and Transient Airflow  
*K. J. Wołosz*
- 09 Aerodynamic Analysis of a Quadcopter Drone Propeller with the Use of Computational Fluid Dynamics  
*K. Christodoulou, M. Vozinidis, A. Karanatsios, E. Karipidis, F. Katsanevakis, Z. Vlahostergios*
- 10 Effect of Geometry on Homogenization of Two Layers Stratified Liquid  
*J. Bobek, D. Rippel-Pethő, R. Bocsi, B. Tarcsay*
- 11 Numerical Analysis and Experimental Measurements of a Small Horizontal Wind Turbine Blade Profile for Low Reynolds Numbers  
*C. Papadopoulos, P. Kaparos, Z. Vlahostergios, D. Misirlis*
- 12 CFD Modelling and Simulation of a VOC Removal Silo  
*A. Egedy, L. Gyurik, Z. Ulbert, A. Rado*
- 13 Possibilities for the Reduction of Water Consumption in Steel Industry and Continuous Steel Casting: An Overview  
*L. Klimeš, P. Charvát, T. Bohunský, J. J. Klemeš, J. Štětina*
- 14 CALS-System for Geo-Ecological Monitoring of the Environmental Impact of Anti-Icing Reagents  
*A. Glushko, A. Bessarabov, G. Priorov*
- 15 Approaching Electrodes Configurations in Bio-Electrokinetic Deoiling of Petrochemical Contaminated Soil  
*B. Gidudu, E. M. N. Chirwa*
- 16 Heat Exchanger Reliability Analysis Based on Fouling Growth Model by Fault Tree Analysis  
*W. Xiao, Z. Hao, X. Jiang, X. Li, X. Wu, G. He*
- 17 Thermal Design of a Shell and Tube Heat Exchanger with Internal Fins  
*L. Hu, T. Ma, P. Zhang, Q. W. Wang*
- 18 Lattice Boltzmann Simulation of Metallic Powder Melting During Additive Manufacturing  
*R. Dai, N. Li, T. Deng, Q. Bian, M. Zeng, Q. W. Wang*
-

- 19 Recovery and Application of Low-Grade Thermal Resources in the Mining Industry  
**S. H. McLean, J. Chenier, S. Muinonen, C. Laamanen, J. A. Scott**
- 
- 20 The Optimal Design of Welded Plate Heat Exchanger with Intensified Heat Transfer for Ammonia Synthesis Column  
**P. Y. Arsenyev, L. L. Tovazhnyanskyy, J. J. Klemeš, O. P. Arsenyeva, O. Y. Perevertaylenko, P. O. Kapustenko**
- 
- 21 Numerical Modelling of Turbine Blade Cooling for Aero Engine Applications with the Use of Surrogate Models  
**D. Misirlis, Z. Vlahostergios, C. Salpingidou, M. Flouros, F. Donus, K. Yakinthos**
- 
- 22 A Critical Analysis of the Hot-Wire Technique for Thermal Conductivity Measurements of Thermal Nanofluids  
**S. Moodley, D. Lokhat**
- 
- 23 An Experimental Verification of Pressure Drop for Integrated Regenerative Equipment  
**B. Kilkovský, Z. Jegla**
- 
- 24 Enhanced Superstructure-Based Model for Synthesis of Sub-Ambient Heat Exchanger Networks with Expansion Process  
**R. Yang, Y. Zhuang, L. Zhang, L. Liu, J. Du**
- 
- 25 Optimization of Hybrid Separation System for CO<sub>2</sub> Capture  
**Y. Hu, Y. Ren, Z. Liao, J. Sun, B. Jiang, J. Wang, Y. Yang**
- 
- 26 Cost Optimisation of a Flexible Heat Exchanger Network with Fluctuation Probability Using Break-Even Analysis  
**A. M. Hafizan, S. R. Wan Alwi, Z. A. Manan, J. J. Klemeš, M. K. A. Hamid**
- 
- 27 Mathematical Programming for Heat Exchanger Network Design with Temperature-Dependent Specific Heat Capacity  
**S. Valeekiatkul, K. Siemanond**
- 
- 28 Comparison of Different Concepts of Condensation Heat Exchangers with Vertically Oriented Pipes for Effective Heat and Water Regeneration  
**F. Toman, P. Kracík, J. Pospišil, M. Špiláček**
- 
- 29 Simultaneous Synthesis of Heat Exchanger Network and Utility System Considering Inter- and Inner-Stage Heaters  
**Y. Sheng, L. Liu, L. Zhang, J. Du**
-

- 30 Heat Exchanger Network Synthesis with Absorption Refrigeration Cycle Integrated Considering the Optimization of Operating Conditions  
*X. Sun, L. Liu, Y. Sheng, L. Zhang, J. Du*
- 
- 31 Process Integration Using a Joule Cycle Heat Pump  
*L. Gai, P. S. Varbanov, T. G. Walmsley, J. J. Klemeš*
- 
- 32 Application of Flexibility Index Approach for Sustainable Operation of Heat-Integrated Autothermal Thermophilic Aerobic Digestion System  
*R. K. Vladova, E. G. Kirilova, N. G. Vaklieva-Bancheva*
- 
- 33 Synthesis of Combined Heat Exchange Network and Utility Supply Chain  
*Nick Cowen, Andy Vogel, A.J. Isafiade, L. Čuček, Z. Kravanja*
- 
- 34 Control of Heat Exchangers Using Complex Control Structures with Neural Network Predictive Controllers  
*A. Vasičkaninová, M. Bakošová, J. Oravec, A. Mészáros*
- 
- 35 Economic Assessment of a Crude Oil Hydrotreating Process  
*W. Muhsin, J. Zhang*
- 
- 36 Evaluation of Polycarboxylate Ethers that can Mitigate the Detrimental Effects of Clay Content of Sand on Concrete Workability and Strength  
*S. Mlalazi, S. M. Tichapondwa, W. Mhike*
- 
- 37 Hydrodynamics as a Tool to Remove Biofilm in Tubular Photobioreactor  
*T. Zakova, T. Jirout, L. Kratky, V. Belohlav*
- 
- 38 Development of a New Graphical Tool for Calculation of Exergy Losses in Sub-Ambient Processes  
*M. H. Panjeshahi, N. Tahouni*
- 
- 39 Exergoeconomic Performance Assessment of a Sulfuric Acid Production Unit Using the Specific Exergy Costing Method  
*A. Mabrouk, X. Erdocia, M. G. Alriols, J. Labidi, M. R. Jeday*
- 
- 40 Optimization of Water Network in a Viscose Fiber Plant  
*H. Ding, X. Feng*
- 
- 41 Development of Industrial Production of Impregnating Compositions for Road Coatings Based on the Concept of CALS  
*G. Priorov, A. Bessarabov, A. Glushko*
-

- 42 Development of Models and Prototypes for the Integrated Technical – Economic Evaluation of Novel Energy and Environmental Projects Including Externalities  
*M. Kontraros, E. M. Kondili, J. K. Kalpellis*
- 
- 43 Non-Linear Programming via P-Graph Framework  
*B. S. How, S. Y. Teng, W. D. Leong, W. P. Q. Ng, C. H. Lim, S. L. Ngan, H. L. Lam*
- 
- 44 Towards a Foresight Methodology for Adriatic-Ionian Port Areas Focusing on the Energy Sector  
*N. Koukopoulos, F. Stergiopoulos, C. Ziogou, S. Voutetakis, I. Metaxa, M. Padula, F. Picenni, R. Malvezzi*
- 
- 45 Effect of Supersonic Nozzle Structure on Vapor Spontaneous Condensation  
*Z. Duan, L. Liang, Y. Xie, Z. Ma, C. Li*
- 
- 46 Implementation of Circular Economy through the Mathematical Programming for the Complex System Evaluation  
*R. Šomplák, V. Smejkalová, V. Nevrly, J. Pluskal, M. Pavlas*
- 
- 47 A Superstructure based Optimisation Approach for Regeneration Reuse Water Network with a Detailed Nanofiltration Model  
*N. Machakaire, T. Majoz*
- 
- 48 A Mathematical Formulation of a Hybrid Seawater Electrolyser/Fuel Cell System  
*M. Singh, T. Majoz, P. Mukoma, A. B. North*
- 
- 49 Material Flow Cost Account-Based Approach for Synthesis and Optimisation of Wastewater Treatment Plant  
*J. Y. Ho, Y. K. Wan, V. Andiappan, D. K. S. Ng*
- 
- 50 An Integrated Approach to Prioritise Parameters for Multi-Objective Optimisation: A Case Study of Biomass Network  
*S. Z. Yeo, B. S. How, S. L. Ngan, W. P. Q. Ng, W. D. Leong, C. H. Lim, H. L. Lam*
- 
- 51 A Systematic Method for the Design and Optimization of Ion Exchange Resins  
*D. P. Morar, T. Majoz*
-

- 52 Synthesis of Reactors Network: A Heuristic Strategy for Isothermal Conditions  
*V. P. Teixeira, M. A. S. S. Ravagnani, C. B. B. Costa*
- 
- 53 Improving Uncertainty Modelling for a Chance-Constrained Optimization Framework  
*B. H. Löwgren, J. Weigert, E. Esche, J. -U. Repke*
- 
- 54 A Data-Driven Optimization Approach for the Optimization of Shale Gas Supply Chains under Uncertainty  
*J. Gao, F. You*
- 
- 55 Optimizing Abnormal Operations of Off-Grid Community Utility Systems with Fuzzy P-Graph  
*K. B. Aviso, I. A. V. Marfori Iii, R.R. Tan, A. T. Ubando*
- 
- 56 Hybrid Modelling of a High-Pressure Control Valve of a Steam Turbine at Off-Design Modes Using First-Principle Mechanism and Operational Data  
*J. Yu, P. Liu, Z. Li*
- 
- 57 The Effect of Valve Timing on Performance of 2-Cylinder Turbo Gasoline Engine under Medium and High Load Condition  
*J. Jang, Y. Pyo, A. Ko, Y. Jung, Y. Woo, G. Kim, Chongpyo Cho, M. Han*
- 
- 58 Kalina Power-Cooling Plant Triple-Stage Optimization for Design and Operation of Cooling and Power Generation - Energy and Economic Analysis  
*M. J. Dehghani, K. Nam, C. Yoo*
- 
- 59 Improved Intelligent Identification of Hammerstein-Wiener Systems by Particle Swarm Optimization and K-Means Clustering  
*Z. Wang, H. An, X. Luo*
- 
- 60 One-Dimensional Aerothermodynamics Modelling for Gas Turbine Design Considering Effect of Thermal Barrier Coating  
*Y. Zhang, P. Liu, Z. Li*
- 
- 61 A Framework of Life Cycle Sustainability Assessment Modeling of Buildings  
*Y. Dong, P. Liu*
- 
- 62 The Longitudinal Flow of Oil and Petroleum Products in the Channels and Pipes: Part II  
*V. Ved, L. Tovazhnyansky, Y. Tolchinsky, A. Mussabekov, A. Suigenbayeva, A. Saipov*
-

- 63 Optimization of an Absorption-Based Biogas Upgrading and Liquefaction Process  
**S. E. Hashemi, K. M. Lien, S. K. Schnell, B. Austbø**
- 
- 64 Effect of Regeneration Conditions on Dehumidification Desiccant Packed Bed  
**S. Murathathunyaluk, J. Junjiewchai, P. Kitchaiya**
- 
- 65 Analysis of the Informative Data of Industrial Data-Based Modelling  
**L.-K. Yuan, B.-C. Xu, Z.-S. Liang**
- 
- 66 Energy and Water Consumption of a Stand-Alone Plant for Hydrogen Production from Molasses - A Parametric Study  
**R. Grabarczyk, M. Trafczyński, K. Urbaniec, J. Wernik**
- 
- 67 Constrained Recursive Input Estimation of Blending and Mixing Systems  
**J. Abonyi**
- 
- 68 A Method for Evaluating Structural Changes of Energy Flow Process with the Case Study of China from 2005-2015  
**H. Yang, L. Ma, Z. Li, W. Ni**
- 
- 69 The Rheological Properties of Semolina Doughs: Influence of the Relative Amount of Ingredients  
**F. Fanari, F. Desogus, E. A. Scano, G. Carboni, M. Grosso**
- 
- 70 Systematic Assessment of Model Robustness in Simulation of Absorption Refrigeration Processes  
**D. Gkouletsos, A. I. Papadopoulos, P. Seferlis, I. Hassan**
- 
- 71 Heat Transfer Modeling in Soil Microwave Heating  
**F. Fanari, C. Dachena, R. Carta, F. Desogus**
- 
- 72 Impact of Cumulative Fouling Characteristics on Full-Cycle Operation Optimisation of Multi-Effect Distillation Desalination System  
**C.-B. Chen, L. Sun, D.-J. Liu, X.-L. Luo**
- 
- 73 Modelling of CO<sub>2</sub> Frost Formation and Growth on a Flat Plate  
**S. Haddad, R. Rivera-Tinoco, C. Bouallou**
-

## ARCHIMIDES HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.5

#### SYNTHESIS

CHAIRS: **Zdravko Kravanja, Emilia Kondili**

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15:00	Multi-period Heat Exchanger Network Synthesis with Temperature Intervals and Uncertain Disturbances <i>K O. Yoro, A. J. Isafiade, M. O. Daramola</i>
15:20	<b>KEYNOTE LECTURE</b> Simultaneous Synthesis of Controllable Heat Exchanger Networks <i>C. Li, L. Liu, L. Zhang, S. Gu, J. Du</i>
16:00	Simultaneous Synthesis of Processes with its Heat Exchanger Networks: P-graph Approach <i>Á. Orosz, J. Pimentel, F. Friedler</i>
16:20	Layout Optimisation of Multi-Frame Process Unit <i>S. Xu, Y. Wang, X. Feng</i>
16:40	COFFEE BREAK (Veranda)

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## DEMOCRITUS HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.6

#### OPTIMISATION

CHAIRS: **Raymond R. Tan, Jenő Hancsók**

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15:00	<b>KEYNOTE LECTURE</b> A Multiobjective Mixed-Integer Bilevel Linear Programming Approach to Global Crude Oil Purchase and Sale with Noncooperative Stakeholders <i>J. T. Nicoletti, F. You</i>
15:40	A Multiobjective Mixed-Integer Bilevel Linear Programming Approach to Global Crude Oil Purchase and Sale with Noncooperative Stakeholders <i>N. Somthong, T.-H. Wang, J.-Y. Lee, C.-L. Chen</i>
16:00	Simultaneous Heat and Mass Flow Optimization of a Distillation Column Applying the FluxMax Approach <i>D. Schack, G. Liesche, K. Sundmacher</i>
16:20	Graphical Pinch Analysis Approach to Cash Flow Management in Engineering Project <i>J. M. C. Ongpeng, K. B. Aviso, D. C. Y. Foo, R. R. Tan</i>

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16:40 COFFEE BREAK (Veranda)

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## EUCLID HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.7

#### CHEMICALS

CHAIRS: **Martín Picón-Núñez, Joey D. Ocon**

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15:00 Rethinking Energy Use for a Sustainable Chemical Industry

**A. A. Kiss**

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15:20 Application of Dynamic Simulation to Safety Design and Effective Operation of Chemical Processes

**S. Hwang, Z. Kim, Y. Shin, Y. Jo**

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15:40 KEYNOTE LECTURE

Production Of Chemical Precursors from Polysacharide

**A. Martin, I. Egüés, I. Rivilla, J. Labidi**

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16:20 Influence of Partially-Substituted Zr into Mg4.78Al Layered Double Oxide on Glycerol Conversion to Valuable Specialty Bio-Based Chemicals

**T. Leungcharoenwattana, S. Jitkarnka**

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16:40 COFFEE BREAK (Veranda)

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## THALES HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.8

#### POWER SYSTEMS

CHAIRS: **Athanasios Papadopoulos, Jan Taler**

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15:00 Comparative Critique on Power Generation in Wind Turbines

**N. M. Nasab, J. Kilby, L. Bakhtiaryfard**

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15:20 Development of PANI Layer as a Buffer Layer for Perovskite Solar Cell

**D. I. Kim, J. W. Lee, R. H. Jeong, J. W. Yang, J. H. Boo**

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15:40 Energy Management in an Islanded Multi-Node Microgrid Based on Nonlinear Model Predictive Control (NMPC)

**D. Trigkas, C. Ziogou, S. Parcharidis, S. Voutetakis, S. Papadopoulou**

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16:00 KEYNOTE LECTURE

Photovoltaic technologies and overview of cooling techniques for performance improvement

**S. Nižetić**

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16:40 COFFEE BREAK (Veranda)

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## ARCHIMIDES HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.9

#### EMISSIONS

CHAIRS: **Xia Liu, Eugeny Kenig**

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- 17:00 Techno Economic Analysis of Carbon Dioxide Capture and Utilisation Analysis for an Industrial Site with Fuel Cell Integration  
*J. M. John, S. R. Wan Alwi, D. I. Omoregbe*
- 
- 17:20 Modeling of greenhouse gas emissions during wastewater treatment process and the preliminary study on its reduction with PID control  
*W. Shen, F. Huang, X. Zhang, P. Seferlis*
- 
- 17:40 Energy Design Synthesis for Buildings: An Example  
*I. Kistelekdi, K. R. Horváth, Z. Kovács, Z. Ercsey*
- 
- 18:00 Process Synthesis and Controllability Assessment of CO<sub>2</sub> Capture Plants in a Parallel Environment  
*N. Vasillas, P. Natsiavas, A. I. Papadopoulos, P. Seferlis*
- 
- 18:20 Towards Sustainable Management of Food Waste Energy in Europe  
*D. Hoehn, J. Laso, M. Margallo, Á. Irabien, B. Solano-Rodriguez, I. Butnar, R Aldaco*
- 

## DEMOCRITUS HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.10

#### RENEWABLES AND STORAGE

CHAIRS: **Kyriakos Panopoulos, Yongzhong Liu**

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- 17:00 System Efficiency Rating of Industrial Utilities in Electricity Grids with a high share of Variable Renewable Energies  
*V. Selleneit, M. Stöckl, M. Philipp, T. Mast, U. Holzhammer, F. Schlosser*
- 
- 17:20 Impacts of Supply-Demand Characteristics on Optimal Configuration of Energy Storage System with Multiple Types of Batteries  
*Y. Jiang, L. Kang, Y. Liu*
-

- 17:40 Flexible and Scalable Energy Management of Islanded Renewable Energy Sources Storage Systems  
**A. Kafetzis, C. Ziogou, K. Panopoulos, S. Papadopoulou, P. Seferlis, S. Voutetakis**
- 
- 18:00 Optimal Configurations for the Integration of Power Cycles in Concentrated Solar Plants with Thermochemical Energy Storage  
**E. Guelpa, M. Capone, U. Tesio, V. Verda**
- 
- 18:20 Research on External Fuel Exergy Contribution to the Multi-Energy Integrated System  
**J. Zhang, J. Shen, Y. Li, B. Ge**
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## EUCLID HALL, OCTOBER 21<sup>ST</sup>

### SESSION 1.11

#### WASTE TO ENERGY

CHAIRS: **Petro Kapustenko, Lidija Čuček**

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- 17:00 Feedstocks for Engine Fuels from Waste Polyolefins  
**S. Tomasek, N. Miskolczi, K. Ferenc, Z. Varga, J. Hancsók**
- 
- 17:20 Comparison of Charcoal, Ceramics and Dolomite as a Bed Material in Two-Stage Pyrolytic Processing of Wood Waste into the Synthesis Gas  
**V. V. Khaskhachikh, K. O. Krysanova, V. A. Lavrenov, V. M. Zaichenko**
- 
- 17:40 Production of Liquid Compounds by Co-Pyrolysis of Different Pre-Treated Biomasses Mixed With Plastic Wastes  
**F. Pinto, L. C. Duarte, F. Carvalheiro, F. Paradela, P. Costa, J. Marques, R. André, P. Marques, D. Costa, B. Sampaio**
- 
- 18:00 Production of Diesel Fuel with Alternative Components Content from Various Wastes  
**O. Tóth, A. Holló, J. Hancsók**
- 
- 18:20 Pyrolysis of Agricultural Waste in the Presence of Fe-Subgroup Metal-Containing Catalysts  
**Y. V. Lugovoy, K. V. Chalov, Y. Y. Kositsov, E. M. Sulman, M. G. Sulman**
-

**THALES HALL, OCTOBER 21<sup>ST</sup>**

SESSION 1.12

**CONTROL**

CHAIRS: **Anton Kiss, Xionglin Luo**

- 
- 17:00 Robust Control of Continuous Stirred Tank Reactor with Jacket Cooling  
**R. Prokop, R. Matušů, J. Vojtesek**
- 
- 17:20 Time Delay Compensation Based Active Disturbance Rejection Control for Thermal Process  
**F. Zhang, Y. Xue, D. Li, Z. Li**
- 
- 17:40 Convex-lifting-based Robust Control of a Laboratory Plate Heat Exchanger  
**J. Oravec, M. Bakošová, M. Horváthová, L. Galčíková, M. Slávik, A. Vasičkaninová, A. Mészáros**
- 
- 18:00 Dynamic Optimization of Continuous Chemical Process with Batch Operation Variable: A Case Study of a Fluid Catalytic Cracking Unit with CO Promoter  
**J.-J. Lin, F. Xu, X.-L. Luo**
- 
- 18:20 Parameters Optimization of MTBE Reactive Distillation Process with Response Surface Methodology  
**W. Xiao, Y. Zhang, X. Wang, X. Jiang, W. Ma, G. He**
-

22

TUESDAY, OCTOBER 22<sup>ND</sup>

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**ARCHIMIDES – DEMOCRITUS – EUCLID HALL**

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**PLENARY LECTURE II**

CHAIRS: **Petr Stehlík, Petar Varbanov**

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9:00	Centralised Large-Scale Water Demand Planning and Management Across Industrial Sites <i>Sharifah R. Wan Alwi, Z. A. Manan</i>
10:00	COFFEE BREAK (Veranda)

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**ARCHIMIDES HALL, OCTOBER 22<sup>ND</sup>**

SESSION 2.1

**SPIL SYMPOSIUM**

CHAIRS: **Petar Sabev Varbanov, Hon Huin Chin**

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10:30	<b>KEYNOTE LECTURE</b> Visualising and Retrofitting Energy and Exergy Flows in Process Heat Transfer Networks <i>T. G. Walmsley, P. Y. Liew, P. S. Varbanov, J. J. Klemeš</i>
11:10	Assessment of Greenhouse Gas Emissions from Various Energy Sources <i>X.-C. Wang, J. J. Klemeš, X. Dong, M. Sadenova, P. S. Varbanov, G. Zhakupova</i>
11:30	Graphical Break-Even Based Decision-Making Tool (BBDM) to Minimise GHG Footprint of Biomass Utilisation: Biochar by Pyrolysis <i>Y. V. Fan, J. J. Klemeš, R. R. Tan, P. S. Varbanov</i>
11:50	Blue Water Footprint of the Czech Republic <i>X. Jia, J. J. Klemeš, P. S. Varbanov, S. R Wan Alwi</i>
12:10	A Kraft Mill-Integrated Biorefinery for Biofuel Production <i>B. H. Y. Ong, T. G. Walmsley, M. J. Atkins, M. R. W. Walmsley</i>
12:30	LUNCH (Pangea Restaurant)

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## DEMOCRITUS HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.2

#### HEAT TRANSFER

CHAIRS: **Zinon Vlahostergios, Theodoros Damartzis**

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10:30	Numerical Study of Flow and Heat Transfer in Gravity-Driven Particle Flow Around a Circular or Elliptical Tube <i>X. Tian, J. Yang, Z. Guo, Q. Wang, B. Sunden</i>
10:50	Condensation Heat Transfer Characteristics of Moist Air Outside Hydrophilic and Super-hydrophobic 3D Pin Fin Tube <i>Y. Gu, Y. Ding, Q. Liao, Q. Fu, X. Zhu, H. Wang</i>
11:10	The Effect of Plate Corrugations Geometry on Performance of Plate Heat Exchangers Subjected to Fouling <i>O. I. Matsegora, J. J. Klemeš, O. P. Arsenyeva, P. O. Kapustenko, S. K. Kusakov, V. V. Zorenko</i>
11:30	Incorporating the Use of a Fouling Model in the Design and Operation of Cooling Networks <i>H. Lugo-Granados, L. Canizalez-Dávalos, M. Picón-Núñez</i>
11:50	<b>KEYNOTE LECTURE</b> Experimental Comparison of the Condensation and Evaporation Heat Transfer Coefficients <i>D. J. Kukulka, R. Smith, W. Li</i>
12:30	LUNCH (Pangea Restaurant)

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## EUCLID HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.3

#### BIOENERGY

CHAIRS: **Kathleen B. Aviso, Sungwon Hwang**

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10:30	Design and Integration of Bio-Oil Co-Processing with Vacuum Gas Oil in a Refinery <i>L. Wu, J. Wang, M. Shi, Y. Wang, L. Zheng</i>
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10:50

### KEYNOTE LECTURE

Novel Biomass Upgrading Plant as a Renewable Source of Added-Value Chemicals

*T. Wang, N. Kezibri, C. Bouallou*

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11:30

Biomass Conversion to Methanol Integrating Solid Oxide Cells and Two-Stage Gasifier: Effects of Carbon Dioxide Recirculation and Pressurized Operation

*G. Butera, S. H. Jensen, R. Ø. Gadsbøll, J. Ahrenfeldt, L. R. Clausen*

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11:50

The Potential Energy Efficiency Improvements for the Italian Pulp and Paper Industry

*S. Maggiore, C. N. Businge, M. Borgarello, A. Realini, E. Gobbi, C. Zagano, F. Bazzocchi*

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12:10

Energy Analysis of a Process Converting Power and Biomass to a Liquid Fuel

*M. Ostadi, B. Austbø, M. Hillestad*

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12:30

LUNCH (Pangea Restaurant)

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## THALES HALL, OCTOBER 22<sup>ND</sup>

SESSION 2.4

### WASTE UTILISATION

CHAIRS: **Spyridon Voutetakis, Martin Miltner**

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10:30

Experimental Analysis of Parameters Influencing Biodegradable Waste Pretreatment

*R. Bedočić, L Čuček, T. Pukšec, B. Ćosić, A. Špehar, N. Duić*

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10:50

Bio-paraffin Mixture Production from Waste Lard

*O. Visnyei, A. Holló, G. Varga, A. Thernesz, J. Hancsók*

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11:10

### KEYNOTE LECTURE

Impact of Parameters of Municipalities on Quantities of the General and Recycled Urban Waste in Taiwan

*H.-C. Sung, Y.-S. Sheu, B.-Y. Yang, C.-H. Ko*

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11:50

Fuels by Chemical Recycling of Waste Plastic and Biomass Mixture and Utilization of the Products

*F. Bahmed, N. Miskolczi, V. Zsinka*

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- 12:10 Treatment and Utilization of Solid Residues from Waste Combustion Facilities and Carbon Black Waste for a Sustainable Environment

**Z. Yao, A. K. Prabhakar, B. C. Mohan, C.-H. Wang**

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- 12:30 LUNCH (Pangea Restaurant)
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## POSTER SESSION II

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- 74 Fault Detection Analysis Before and after Dynamic Model Reforming on the Benchmark Tennessee Eastman Process  
**B. Chen, Z. Wang, X. -L. Luo**
- 
- 75 Economic Optimization Based on Control Redundancy for Zone Model Predictive Control  
**X. Wan, X. -L. Luo**
- 
- 76 Predictive Control of a Heat Exchanger Network Based on an Artificial Neural Network Model  
**M. Ravagnani, E. Carvalho, C. Carvalho**
- 
- 77 Bypass Control System Design for HENS Based on Frequency Domain Analysis  
**L. Sun, Z. -H. Yang, X. -L. Luo**
- 
- 78 Advanced Control of a Biochemical Reactor for Yeast Fermentation  
**M. Bakošová, J. Oravec, A. Vasičkaninová, A. Mészáros, P. Artzová**
- 
- 79 Novel Economic Method for Continuous Optical Analysis of Turbidity  
**F. V. Lubbe, H. G. Brink**
- 
- 80 Process Control Strategy of Amine-Based Post-Combustion CO<sub>2</sub> Capture Systems  
**A. M. Cormos, M. Burca, F. Illea, M. V. Cristea**
- 
- 81 Novel Parameter Estimation Method for Molecular Reconstruction of Naphtha by Gamma Distribution  
**Y. Ren, Z. Liao, J. Sun, B. Jiang, J. Wang, Y. Yang, Q. Wu**
- 
- 82 Comparing Learning Strategies in Understanding Process Integration, Optimization and Sustainability  
**R. I. G. Lucas, K. B. Aviso, M. A. B. Promentilla, L. Čuček, A. J. Isafiade, J. Y. Lee, R. R. Tan**
-

- 83 Rate-Based Modelling and Validation of an Absorber and Stripper in an Amine-Based Post-Combustion CO<sub>2</sub> Capture Process  
*H. Jin, J. Li, P. Liu, Z. Li*
- 84 Different Semi-Batch Distillation Policies for Decreasing Energy Demand  
*P. Lang, L. Hegely*
- 85 Process Simulation of Syngas Purification by Gas Permeation Application  
S. Sharifian,  
*N. Asasian-Kolur, M. Harasek*
- 86 Development of the Stochastic Lattice Model for Describing Aggregation Processes in the Polydisperse Systems (3D Case)  
*L. Musabekova, N. Zhumataev, A. Yunussova, N. Dausheyeva, A. Zhidabayeva*
- 87 Energy Consumption in Sharp and Non-Sharp Splits of Ideal Ternary Mixtures  
*S. Expósito, J. Bone, A. E. Plešu, J. Llorens, P. Iancu, V. Plesu*
- 88 Simulation and Optimization of a Multitubular Reactor Train for Acrylic Acid Production  
*D. Lokhat, K. Premlall*
- 89 Hydration of Cyclohexene to Cyclohexanol in a Hybrid Reactive Distillation with a Side Decanter  
*I. Marchante, A. E. Plešu, V. Plešu, J. Bonet-Ruiz, P. Iancu, J. Llorens*
- 90 Study of a Renewable Capping Agent Addition in Lignin Base Catalyzed Depolymerisation Process  
*F. Hernandez-Ramos, J. Labidi, X. Erdocia*
- 91 Comparative Pathway Analysis for Microbial Cr(VI) Reduction in Pure Cultures of *Bacillus thirungiensis* and *Escherichia coli* ATCC 33456  
*E. M. N. Chirwa, M. M. Roestorff, P. Molokwane, T. E. Igboamalu, M. Matsena, N. Mbonambi*
- 92 Permittivity Measurements of Mixtures as a Function of their Composition for Microwave Heating Improving  
*F. Fanari, G. Muntoni, C. Dachena, R. Carta, F. Desogus*
- 93 Polymeric Catalysts Synthesized by the Hydrothermal Metal Deposition in the Fischer-Tropsch Synthesis  
*M. E. Markova, A. V. Gavrilenko, A. A. Stepacheva, V. G. Matveeva, A. I. Sidorov, M. G. Sulman, E. M. Sulman*
-

- 94 Catalytic Hydrogenolysis of Lignin for the Synthesis of Biokerosene  
*E. I. Shimanskaya, E. M. Sulman, A. M. Sulman, A. A. Stepacheva, M. G. Sulman, V. Y. Doluda*
- 
- 95 Design Methodology of Industrial Equipment for Microalgae Biomass Primary Harvesting and Dewatering  
*V. Belohlav, T. Jirout*
- 
- 96 Smart and Hybrid Cooling Techniques for Silicon-Based Photovoltaic Panels: Necessity and Challenges  
*S. Nižetić, M. Jurčević, D. Čoko, A. Papadopoulos, E. Giama, M. Arıcı*
- 
- 97 Grid Parity and Defection Studies in Major Philippine Cities Using Solar Photovoltaic-Plus-Storage Configuration  
*N. G. E. Saplagio, E. A. Esparcia Jr., P. G. B. Jara, H. Meschede, J. D. Ocon*
- 
- 98 Effects of Working Temperature on Route Planning for Electric Bus Fleets Based on Dynamic Programming  
*J. Wang, L. Kang, Y. Liu*
- 
- 99 Long-Discharge Flywheel Versus Battery Energy Storage for Microgrids: a Techno-Economic Comparison  
*E. A. Esparcia Jr., M. T. Castro, R. E. Buendia, J. D. Ocon*
- 
- 100 Analyses on Visible Light Transmission and Color Reproducibility for Dye Sensitized Solar Cell  
*H. Lee, S. Le*
- 
- 101 Wind Resource Assessment using Weibull Function for Different Periods of the Day in the Yucatan Peninsula  
*G. Alcalá, A. J. Perea-Moreno, Q. Hernandez-Escobedo*
- 
- 102 Enhanced Transmittance of Texturing Glass Surface with Anti-Reflection Layer for Perovskite Solar Cell  
*D. I. Kim, S.-H. Nam, J. W. Lee, R. H. Jeong, J.-H. Boo*
- 
- 103 A Techno-Economic Assessment of Small Energy Access Microgrids in the Philippines  
*P. Baricaua, E. Esparcia Jr., C. M. Odulio, J. D. Ocon*
- 
- 104 Incentive-based Energy Management Strategies for Smart-grids based on an Internet of Things (IoT) Connectivity Framework  
*C. Ziogou, S. Papadopoulou, S. Voutetakis*
-

- 105 Optimum Design of a Cooling Water System with a Batch Background Process  
*V. Dippenaar, T. Majozí*
- 
- 106 Synthesis and CO<sub>2</sub> Absorption of Anhydrous Colloidal Suspension Based on Hollow Silica Nanospheres  
*Y. Ding, L. Guo, X. Li, Q. Liao, X. Zhu, H. Wang*
- 
- 107 Machine Learning-Based Prediction of Carbon Dioxide Storage Site Integrity  
*K. B. Aviso, J. I. B. Janairo, M. A. B. Promentilla, R. R. Tan*
- 
- 108 Waste CO<sub>2</sub> Separation Technologies: A Technical Overview  
*L. Krátký*
- 
- 109 Metal-Organic Framework (MOF) Based Adsorbents for CO/CO<sub>2</sub> Separation  
*J. Kim, T. K. Vo*
- 
- 110 Construction and Experimental Testing of a CO<sub>2</sub> Capture Pilot Plant  
*P. Nessim, F. Tzirakis, G. Dourou, S. Voutetakis, A.I. Papadopoulos, P. Seferlis*
- 
- 111 Possible Alternatives for Cost-Effective Neutralisation of Fluoroanhydrite Minimising Environmental Impact  
*G. Zhakupova, M. Sadenova, P. S. Varbanov*
- 
- 112 On the Relationship between Private Transportation Expenditure and Socio-Demographic Variables  
*G. Besagni, C. N. Businge, M. Borgarello*
- 
- 113 Optimal Multi-Criteria Selection of Energy Storage Systems for Grid Applications  
*S. M. M. Cruz, E. J. Esparcia, J. D. A. Pascasio, R. R. Tan, K. B. Aviso, M. A. B. Promentilla, J. D. Ocon*
- 
- 114 Analysing Shale Gas Energy Systems using Dynamic Material Flow Analysis  
*J. Gao, F. You*
- 
- 115 A Systematic Approach for Selecting Suitable Wave Energy Converters for Potential Wave Energy Farm Sites  
*D. V. Bertram, O. Oskaritz, A. H. Tarighaleslami, M. R.W. Walmsley, M. J. Atkins, G. Glasgow*
-

- 116 Integrated Process-Product Design based on COSMO-SAC model:  
Application to the Production of 2,2,4-Trimethyl-1,2-H-Dihydroquinoline  
(TMQ)  
*J. Pang, L. Zhang, L. Liu, J. Du, Y. Zhuang*
- 117 Effect of the Relative Amount of Ingredients on the Thermal Properties of  
Semolina Doughs  
*F. Fanari, G. Carboni, M. Grossi, F. Desogus*
- 118 Experimental and Modelling Analysis of Liquid-Liquid Formation in Alcohol-  
mixed Gasoline Fuel  
*P. Wongpromrat, M. Rukquan, A. Anantpinijwatna*
- 119 Cogeneration Optimisation for Locally Integrated Energy Systems  
*P. Y. Lee, P. Y. Liew, T. G. Walmsley, J. J. Klemeš*
- 120 Identification of the Optimal Distillation Sequence Based on the Integration  
of Reaction-Distillation-Recycle System  
*D. Lv, C. Yin, G. Liu*
- 121 Integration of water networks with multiple regeneration units  
*F. Yang, X. Fan, Z. Liu*
- 122 Effects of Secondary Dust Lifting on Ambient Particulate Matter in Open-  
yard Stockpile  
*Z. Duan, K. Wang, Z. Lan, Y. Guo, Y. Liu*
- 123 Nutrient in Leachate of Biowaste Compost and its Availability for Plants  
*N. F. A. Sanadi, Y. V. Fan, C. T. Lee, N. Ibrahim, C. Li, Y. Gao, P. Y. Ong,  
J. J. Klemeš*
- 124 Forecasting of Waste Production Data with Changes in Credibility and  
Trend  
*V. Smejkalová, R. Šomplák, V. Nevrly, T. Holec*
- 125 Fisheries Wastewater as a Sustainable Media for the Production of Algae-  
Based Products  
*J. B. García-Martínez, N. A. Urbina-Suarez, A. Zuorro, A. F. Barajas-  
Solano, V. Kafarov*
- 126 The Effect of Crystalline Phase on the Simultaneous Degradation of Phenol  
and Reduction of Chromium (VI) Using UV/TiO<sub>2</sub> Photocatalysis  
*T. Mahlape, S. M. Tichapondwa, T. T. Tshuto, E. M. N. Chirwa*
-

- 127 Mercury Adsorption by Sulfurized Adsorbents: Fixed Bed Experiments and Mathematical Modelling  
**N. Asasian-Kolur, S. Sharifian, M. Kavand, T. Kaghazchi**
- 
- 128 Influence of the Support Modification Methods on the Chlorophenol Utilization by the Peroxidase Immobilized on Titanium Dioxide  
*B. B. Tikhonov, P. Yu. Stadolnikova, A. I. Sidorov, V. G. Matveeva, E. M. Sulman, L. Z. Nikoshvili*
- 
- 129 The Effect of Dissolved Oxygen on the UV/TiO<sub>2</sub> Photocatalytic Degradation Mechanism of Phenol  
**L. Jay, E. M. N. Chirwa, S. M. Tichapondwa**
- 
- 130 Isomerization of n-C5/C6 Bioparaffins to Gasoline Components with High Octane Number  
**J. Hancsók, T. Kasza, O. Visnyei**
- 
- 131 Determination of Growth Parameters of Butyric Acid-Degrading Bacterium, *Achromobacter xylosoxidans*, as a Function of Constant Temperatures in Batch System  
*J. B.J. Njalam'mano, E. M. N. Chirwa*
- 
- 132 Quantity-Predictive Vehicle Routing Problem for Smart Waste Collection  
**D. Hrabec, P. Senland, V. Nevrly, P. Popela, A. Hoff, R. Šomplák, M. Pavlas**
- 
- 133 Degradation of Bisphenol-A on an Activated Carbon - CuFe2O4 Catalyst  
**A. Voutetaki, K. Triantafyllidis, V. Samanidou, E. Deliyianni**
- 
- 134 Oil Residue Pyrolysis Process in the Presence of Aluminosilicates  
*K. V. Chalov, Y. V. Lugovoy, Y. Y. Kosivtsov, A. A. Stepacheva, E. M. Sulman*
- 
- 135 Study of Oil Sludge Pyrolysis in the Presence of Calcium Oxide  
**V. Khaskhachikh, G. Gerasimov, V. Kornilieva, N. Gubina**
- 
- 136 Energy Output from a Dual Chamber Anoxic Biofilm Microbial Fuel Cell Subjected to Variation in Substrate Concentration  
**T. E. Igboamalu, B. Needham-Clark, M. T. Matsena, E. M. N. Chirwa**
- 
- 137 Fish Waste Treatment Technology in Biorefinery Concept  
**L. Krátký, P. Zamazal, T. Jirout**
- 
- 138 Study of Pyrolysis of Components and Mixture of Medical Waste  
**G. Gerasimov, V. Khaskhachikh, V. Kornilieva, G. Tarasov**
-

- 139 Performance Evaluation of Biomass Blends with Additives Treated by Hydrothermal Carbonization  
*F. Vallejo, L. A. Díaz-Robles, F. Cubillos, R. Vega, J. Gómez, E. Pino-Cortés, B. Bascuñan, P. Carcamo, F. Parra, A. Urzua, S. Carrasco*
- 140 Production of Syngas Suitable to be Used in Fermentation to Obtain Biochemical Added-Value Compounds  
*F. Pinto, R. André, P. Marques, R. Mata, M. Pacheco, P. Moura, F. Gírio*
- 141 Effect of Waste Type on Liquid Products Yields and Quality Obtained by Co-Liquefaction of Coal and Waste  
*F. Pinto, F. Paradela, P. Costa, R. André, J. Marques, J. M. Hidalgo, J. L. Gomez, C. Snape*
- 142 Energy Dispatch Model for Integrated Waste-to-Energy Plant  
*F. Janošťák, O. Putna, M. Pavlas*
- 143 Effect of Particle Size on Biogas Generation from Sugarcane Bagasse and Corn Silage  
*E. K. Armah, M. Chetty, N. Deenadayalu*
- 144 Product vs Corporate Carbon Footprint: A Case Study for the Spirit Drinks Sectors  
*R. Leivas, J. Laso, D. Hoehn, M. Margallo, P. Fullana-i-Palmer, R. Aldaco*
- 145 Potentials of Bioenergy Supply Derived from Lignocellulosic Waste Biomass from Palm oil Plantation for Thailand  
*S. Chaiprapat, B.-Y. Yang, C.-H. Ko*
- 146 Study of a Drop-Tube Carbonator Reactor for CSP–Calcium Looping Based on a Heterogeneous Reaction Model  
*E. Karasavvas, K. Panopoulos, S. Papadopoulou, S. Voutetakis*
- 147 Validation of Aspen Plus Dynamics Model with an Experimental Vapour Compression Refrigeration Cycle  
*A. Bara, S. T. Kadam, I. Hassan, A. Rahman, A. I. Papadopoulos, P. Seferlis*
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## ARCHIMIDES HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.5

#### PROCESS INTEGRATION

CHAIRS: **Zainuddin Abdul Manan, Nassim Tahouni**

14:30	Energy Savings in Cement Industry: Use of Heat Integration Approach and Simulation Tools <i>D. Ravipati, S. Singh, H. Pandya, S. Dalai</i>
14:50	<b>KEYNOTE LECTURE</b> Design and Scheduling of Batch Plants with Heat-Integration of Intermittently Available Continuous Streams <i>S. Magege, T. Majozzi</i>
15:30	Simulation of Heat-integrated Autothermal Thermophilic Aerobic Digestion System Operating under Uncertainties through Artificial Neural Network <i>N. G. Vaklieva-Bancheva, R. K. Vladova, E. G. Kirilova</i>
15:50	Deep Learning Approach for Industrial Process Improvement <i>S. Y. Teng, V. Máša, P. Stehlík, H. L. Lam</i>
16:10	COFFEE BREAK (Veranda)

## DEMOCRITUS HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.6

#### HEAT TRANSFER

CHAIRS: **Martin Gough, David Kukulka**

14:30	<b>KEYNOTE LECTURE</b> New analytical-numerical method of simple modelling of tubular cross-flow heat <i>D. Taler, J. Taler</i>
15:10	Optimization of Gravity-Driven Granular Flow Around the Tube for Heat Transfer Enhancement <i>Z. Guo, X. Tian, Z. Tan, J. Yang, Q. Wang</i>
15:30	Evaluation of an Evacuated Tube Solar Collector Using Al <sub>2</sub> O <sub>3</sub> Based Nanofluids <i>Z. Said, S. A. Rahman, A. A. Alzarouni, S. Issa</i>

15:50	Modelling and Dynamic Behaviour Analysis of the Steam Supply System for Double-Reactor and Multi-Turbine Nuclear Power Plant <i>C. Cui, J. Shen, J. Zhang, X. Wu, L. Pan</i>
16:10	COFFEE BREAK (Veranda)

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## EUCLID HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.7

#### BIOENERGY

CHAIRS: **Chun-Han Ko, Benjamin Ong**

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14:30	Waste Biomass Integration to Reduce Fuel Consumption and Levelized Cost of Electricity in Philippine Off-Grid Islands <i>J. D. Pascasio, M. A. R. Dejucos, E. A. Esparcia Jr., J. D. Ocon</i>
14:50	Biomethane Potential of Agricultural Biomass with Industrial Wastewater for Biogas Production <i>E. K. Armah, M. Chetty, N. Deenadayalu</i>
15:10	<b>KEYNOTE LECTURE</b> Fuzzy Optimization of Direct and Indirect Biomass Co-Firing in Power Plants <i>K. B. Aviso, C. L. Sy, R. R. Tan</i>
15:50	Design Parameters of Steam Accumulators for the Utilization in Industrial Solid Biomass-Fuelled CHP Plants <i>M. Stark, M. Philipp, A. Saidi, C. Trinkl, W. Zörner, R. Greenough</i>
16:10	COFFEE BREAK (Veranda)

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## THALES HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.8

#### WORK AND HEAT INTEGRATION

CHAIRS: **Timothy G. Walmsley, M. Hassan Panjeshahi**

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14:30	Heat Pump Integration by Pinch Analysis for Industrial Applications: A Review <i>F. Schlosser, C. Arpagaus, T. G. Walmsley</i>
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14:50	Integration of Heat Pump Storage Systems in Manufacturing Systems via Data Farming and Monte Carlo Simulation <i>J.-P. Seevers, F. Schlosser</i>
15:10	A Simulation-Optimisation Method for Targeting the Optimal Placement of Heat Pumps in Heat Exchanger Networks <i>T. Li, M. Yang, X. Feng</i>
15:30	<b>KEYNOTE LECTURE</b> Synthesis of Work and Heat Exchange Networks Considering Practical Operating Constraints <i>L. V. Pavão, C. B. B. Costa, M. A. S. S. Ravagnani</i>
16:10	COFFEE BREAK (Veranda)

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## ARCHIMIDES HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.9

#### PROCESS INTEGRATION

CHAIRS: **Yasuki Kansha, Elisaveta Georgieva Kirilova**

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16:30	<b>KEYNOTE LECTURE</b> Total Site Heat Integration, Considering Optimum Pressure Drops <i>S. Faramarzi, N. Tahouni, M. H. Panjeshahi</i>
17:10	Combined Flexibility and Energy Analysis of Retrofit Actions for Heat Exchanger Networks <i>C. Langner, E. Svensson, S. Harvey</i>
17:30	Comparison of Graphical Tools for Targeting and Retrofit of Heat Exchanger Networks <i>B.-H. Li, J.-W. Li</i>
17:50	Circulating Cooling Water System Optimisation under Uncertainty <i>B Liu, Y. Wang, X. Feng</i>
18:10	Indirect Inter – Plant Water Integration (IPWI) with Regenerator Selection <i>W. M. Shehata, A. M. Shoaib, F. K. Gad, D. C.Y. Foo</i>

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## DEMOCRITUS HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.10

#### RENEWABLE ENERGY AND UTILITY SYSTEMS

CHAIRS: **Hon Loong Lam, Thokozani Majozi**

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16:30

#### KEYNOTE LECTURE

Defossilising the Swiss Energy System: A Framework for Energy and Carbon Flows Modelling

**T. Damartzis, F. Maréchal**

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17:10

Technoeconomics of Reverse Osmosis as Demand-Side Management for Philippine Off-Grid Islands

**M. T. Castro, E. A. Esparcia Jr., C. M. F. Odulio, J. D. Ocon**

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17:30

Experimental Study of Lab-Scale Organic Rankine Cycle System for Heat and Water Recovery from Flue Gas in Thermal Power Plant

**Y. M. Kim, A. Negash, S. S. M. Shamsi, D. G. Shin, G. Cho**

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17:50

Combined Operation of Photovoltaic and Biogas Plants for Optimal Transformer Loading

**K. Bär, A. Saidi, C. Hackl, W. Zörner**

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18:10

Cogeneration Unit Optimum Sizing for a University Campus

**E. D. Kostopoulos, M. Kaloutsa, E. M. Kondili, J. K. Kaldellis**

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## EUCLID HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.11

#### ENERGY PLANNING

CHAIRS: **Michael Walmsley, Alexandra Elena Pleșu Popescu**

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16:30

A Systematic Approach to the Optimal Planning of Energy Mix for Electric Vehicle Policy

**A. T. Ubando, I. H. V. Gue, M. Rith, J. Gonzaga, N. S. A. Lopez, J. B. M. Biona**

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16:50

Optimal Planning for Introducing Hydrogen Systems in a Multi-node Smart Grid

**C. Galatsopoulos, S. Papadopoulou, C. Ziogou, D. Trigkas, S. Voutetakis**

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17:10

### KEYNOTE LECTURE

The Evolution of Ports into Innovation Hubs: A Proposal for the Adriatic Ionian Area

*N. Koukopoulos, R. Malvezzi, I. Metaxa, M. Padula, F. Picenni, F. Stergiopoulos, S. Voutetakis, C. Ziogou*

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17:50

Modelling and Optimization of Hybrid Distributed Energy Systems for Remote Area Electrification: A Case Study in West China

*J. Li, P. Liu, Z. Li*

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18:10

Multi-Objective Optimisation Method for Identifying Retired Points of Electric Vehicle Batteries

*T. Wang, L. Kang, Y. Liu*

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## THALES HALL, OCTOBER 22<sup>ND</sup>

### SESSION 2.12

### SEPARATION PROCESSES

CHAIRS: Calin-Cristian Cormos, Wu Xiao

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16:30

Integrated Reaction-Separation Processes Sequencing and Screening at Early Stages of Design

*K. Marin, J. Bonet-Ruiz, A. E. Pleșu, V. Pleșu, P. Iancu, J. Llorens*

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16:50

Energy Integration of LNG Light Hydrocarbon Recovery and Air Separation

*R. Zhang, C. Wu, W. Song, C. Deng*

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17:10

### KEYNOTE LECTURE

Application of Membrane Separation for Cleaning and Concentration of Nanolignin Suspensions in a Biorefinery Environment

*M. Miltner, S. Beisl, A. Miltner, J. Adamczyk, R. Gaspar, S. Capelo, M. Harasek, A. Friedl*

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17:50

A Systematic Method for Integrating Reactor and Extractive Distillation Considering the Variation of Reactor Parameters

*C. Yin, D. Lv, G. Liu*

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18:10

Fully Resolved Computational (CFD) and Experimental Analysis of Pressure Drop and Blood Gas Transport in a Hollow Fibre Membrane Oxygenator Module

*M. Harasek, B. Lukitsch, P. Ecker, C. Janeczek, M. Elenkov, T. Keck, B. Haddadi, C. Jordan, S. Neudl, C. Krenn, R. Ullrich, M. Gfoehler*

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23

TUESDAY, OCTOBER 23<sup>RD</sup>

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**ARCHIMIDES – DEMOCRITUS – EUCLID HALL**

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**PLENARY LECTURE II**

CHAIRS: Jiří Jaromír Klemeš, Spyridon Voutetakis

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- 9:00 Ecological Capital: Concept, Measurement and Governance Sustainable Systems Synthesis and Optimization for Efficient Utilization of Resources and Reduction of Greenhouse Gas Emissions  
*Yutao Wang*
- 
- 10:00 COFFEE BREAK (Veranda)
- 

**ARCHIMIDES HALL, OCTOBER 23<sup>RD</sup>**

SESSION 3.1

**SPIL SYMPOSIUM**

CHAIRS: Jiří Jaromír Klemeš, Xue-Chao Wang

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- 10:30 **KEYNOTE LECTURE**  
Systems Analysis of Electricity Transmission Networks for Improved Sustainability  
*R. Lakner, P. S. Varbanov, F. Friedler*
- 
- 11:10 CO<sub>2</sub> Total Site Planning with Centralised Multiple Headers  
*J. Sanghuang, S. R. Wan Alwi, W. N. R. M. Nawi, Z. A. Manan, J. J. Klemeš*
- 
- 11:30 Flexibility Analysis of Heat Exchanger Network Retrofit Designs using Monte Carlo Simulation  
*N. S. Lal, M. J. Atkins, T. G. Walmsley, M. R. W. Walmsley, J. R. Neale*
- 
- 11:50 Application of Pinch Analysis to Opportunistic Maintenance Management  
*H. H. Chin, P. S. Varbanov, J. J. Klemeš, H. L. Lam*
- 
- 12:10 Strategic Plan Method for Future Renewable Energy Technologies  
*A. Gholamzadeh Chofreh, F. A. Goni, M. Davoudi, J. J. Klemeš, S. M. S. Moosavi*
- 
- 12:30 LUNCH (Pangea Restaurant)
-

## DEMOCRITUS HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.2

#### ENERGY STORAGE

CHAIRS: **Yu Zhuang, Adeniyi J. Isafiade**

10:30	Gas Networks, Energy Storage and Renewable Power Generation <i>A. Ekhtiari, D. Flynn, E. Syron</i>
10:50	Batch Process Integration: Management of Capacity-Limited Thermal Energy Storage by Optimization of Heat Recovery <i>J. A. Stampfli, E. J. Lucas, D. G. Olsen, P. Krummenacher, B. Wellig</i>
11:10	Design Optimization of Thermochemical Storage System for 100% Renewable Power Production <i>E. Guelpa, U. Tesio, M. Capone, V. Verda</i>
11:30	Control of Heat Exchangers in Stratified Storage Systems – Simulation and Experimental Validation <i>R. Agner, E. J. Lucas, D. G. Olsen, P. Gruber, B. Wellig</i>
11:50	<b>KEYNOTE LECTURE</b> Cost of Energy Storage Technologies in the New Zealand Context <i>M. Walmsley, M. Atkins, T. G. Walmsley</i>
12:30	LUNCH (Pangea Restaurant)

## EUCLID HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.3

#### BIOENERGY

CHAIRS: **Viatcheslav Kafarov, Michael Harasek**

10:30	Fermentative Hythane Production via Two-stage Fermentation of Algal Bloom Biomass <i>C. Chen, A. Xia, C. Sun, Q. Liao, H. Yun, Q. Fu, X. Zhu, X. Zhu</i>
10:50	<b>KEYNOTE LECTURE</b> Enhancing Gaseous Biofuel Production in A Cascading Bioenergy System <i>R. Lin, C. Deng, J. Murphy</i>

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11:30	A Framework for Biogas Exploitation in Italian Waste Water Treatment Plants <i>G. Oluleye, D. Wigh, N. Shah, M. Napoli, A. Hawkes</i>
11:50	Chance Constrained Optimization of Biodiesel Supply Chain <i>K. Rungphanich, K. Siemanond</i>
12:10	Deoxygenation of Fatty Acids in Supercritical Hexane over Bimetallic Catalyst for Biodiesel Production <i>A. Stepacheva, V. Matveeva, M. Sulman, E. Sulman</i>
12:30	LUNCH (Pangea Restaurant)

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## THALES HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.4

#### ENERGY SYSTEMS

CHAIRS: **Pei Liu, Mauro Ravagnani**

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10:30	<b>KEYNOTE LECTURE</b> Geometrical Optimization of Thermoelectric Generator Integrated Recuperator Using a Combined Method <i>T. Ma, H. Shi, N. Li, Z. Qu, X. Yu, Y. Chen, Q. W. Wang</i>
11:10	Transition of Steam Utility Systems to Solid Biomass-Fuelled Boilers and Biomethane-Fuelled Fuel Cells in the Wet Pet Food Processing Industry <i>R.-H. Peesel, A. Otte, M. Stark</i>
11:30	Reduction of the Energy Demand of Second-Generation Bioethanol Production by Heat Integration and Vapour Recompression Heat Pump <i>L. Hegely, F. Denes, P. Lang</i>
11:50	Integration of Low-grade Waste Heat System Based on Lithium Bromide Refrigeration in a Polysilicon Industry <i>Y. Wang, Y. Wang, X. Feng</i>
12:10	Economic, Energy, Environmental (3E) Analysis of Methanol Production from Shale Gas <i>L. Li, Y. Zhuang, L. Liu, L. Zhang, J. Du</i>
12:30	LUNCH (Pangea Restaurant)

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## PYTHAGORAS HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.5

#### WATER AND WASTEWATER MANAGEMENT

CHAIRS: **Zhi-Yong Liu, Junli Zhang**

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- 10:30 Microbial Pb(II) Precipitation: The Effects of Aeration Conditions and Glucose Presence on a Lead-Mine Consortium

**C. Höristmann, H. G. Brink**

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- 10:50 Sustainability Improvement of Kazakh Chemical Industry via Process Integration: A Case Study of Calcium Chloride Production

**S. Boldyryev, A. Khussanov, K. Gorbunov, O. Gorbunova**

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- 11:10 Redox Potential and Proton Demand in an Anaerobic Palladium (II) Reducing Culture of Desulfovibrio Desulfuricans Seroval

**K. B. Malunga, E. M. N. Chirwa**

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#### KEYNOTE LECTURE

- Biodegradation of Fluoranthene in an Aerated Biofilm Reactor with Biosurfactant Producing CSTR Staged in Series

**T. B. L. Nemudani, E. M. N. Chirwa**

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- 12:10 The Effect of Glucose and Nitrogen Supplementation on Cell Metabolic Activity and the Reduction of Selenite to Elemental Selenium by Pseudomonas Stutzeri NT-I

**J. T. Tendenedzai, H. G. Brink**

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- 13:00 LUNCH (Pangea Restaurant)
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## ARCHIMIDES HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.6

#### CO<sub>2</sub> CAPTURE AND UTILIZATION

CHAIRS: **Peter Lang, Le Wu**

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#### KEYNOTE LECTURE

- Reducing Carbon Footprint of Energy-Intensive Applications by CO<sub>2</sub> Capture Technologies: An Integrated Technical and Environmental Assessment

**A.-M. Cormos, S. Dragan, L. Petrescu, D.-A. Chisalita, S. Szima, V.-C. Sandu, C.-C. Cormos**

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14:20	Economic and Environmental Optimisation Framework for Carbon Capture Utilisation and Storage Supply Chain <b>S. Zhang, R. Tao, L. Liu, L. Zhang, J. Du</b>
14:40	Hollow Fibre-based Rapid Temperature Swing Adsorption Process for Carbon Capture from Coal-fired Power Plants <b>K.-C. Chen, J.-Y. Lee, C.-L. Chen</b>
15:00	Comparative Study of CO <sub>2</sub> Capture Processes by Energy and Characteristics Bases <b>Y. Kansha, M. Ishizuka</b>
15:20	Sustainability Analysis of Phase-Change Solvents for Post-Combustion CO <sub>2</sub> Capture <b>G. Shavalieva, S. Papadokonstantakis, P. Kazepidis, A. I. Papadopoulos, P. Seferlis</b>
15:40	COFFEE BREAK (Veranda)

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## DEMOCRITUS HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.7

### PROCESS INTEGRATION

CHAIRS: **Fan Zhang, Ting Ma**

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13:40	Optimisation of Waste Solvent Regeneration with Two Batch Distillation Columns of Different Size <b>B. Nemeth, L. Hegely, P. Lang</b>
14:00	Hybrid Methodology for Targeting Heat Recovery and Power Generation with Optimal Site Operating Conditions <b>J. Jimenez, R. Smith, A. Azapagic</b>
14:20	Organic Rankine Cycle with Pure and Mixed Working Fluids for LNG Cold Energy Recovery <b>H. Yu, D. Kim, X. Hu, T. Gundersen</b>
14:40	Comparative Water-Power Nexus and Economic Analyses of a Novel Combined Ejector Heat Pump and Steam Power Plant to Tackle Drought <b>P. Ifaei, U. Safder, C. K. Yoo</b>

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15:00

**KEYNOTE LECTURE**

An Efficient Sequential Approach for Work-Heat Exchange Networks  
Synthesis Combined with Meta-Heuristic Strategies

*Y. Zhuang, L. Liu, L. Zhang, J. Du, S. Shen*

15:40

COFFEE BREAK (Veranda)

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**EUCLID HALL, OCTOBER 23<sup>RD</sup>**

SESSION 3.8

**POWER GENERATION**

CHAIRS: **Evans M. N. Chirwa, Yu Zhuang**

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13:40

**KEYNOTE LECTURE**

Thermodynamic Analysis on the Performance of a Low-Enthalpy  
Geothermal Field Using a CO<sub>2</sub> Supercritical Binary Cycle

*D. Chasapis, D. Misirlis, P. A. Papadopoulos, K. Kleidis*

14:20

Process Synthesis of an S-CO<sub>2</sub> Brayton Cycle Operating at an Ultra-Supercritical Steam Cycle Level

*S. Qin, P. Liu*

14:40

Transient Characteristic of Supercritical CO<sub>2</sub> Brayton Cycle with PCM System in a High Frequency Oscillating Environment

*T. Deng, X. Li, T. Ma, Q. Wang*

15:00

Combustion and Emission Characteristics of a Diesel Powered Generator Running with Coffee Ground Pyrolysis Oil

*S. Lee, J. Park, J. Lee, K. Kang*

15:20

Review of Gas Microturbine Application in Industry

*E. Konečná, V. Máša*

15:40

COFFEE BREAK (Veranda)

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**THALES HALL, OCTOBER 23<sup>RD</sup>**

SESSION 3.9

**ENERGY PLANNING**

CHAIRS: **Yutao Wang, Linlin Liu**

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- 13:40 Low Carbon Transition Pathway of Power Sector with High Penetration of Renewable Energy

**S. Chen, P. Liu, Z. Li**

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- 14:00 Short-term Planning of Combined Heat and Power Plants Participating in the Electricity Day-ahead Market

**L. Mallier, G. Hétreux, R. Thery-Hétreux, P. Baudet**

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- 14:20 Multi-Regional Energy Industrial Water Withdrawal Research under Different Energy Development Scenarios: A Case Study of China

**C. Jia, P. Yan, P. Liu, Z. Li**

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**KEYNOTE LECTURE**

- How to Deal with Existing Coal Production Capacity on a Low-Carbon Transition Pathway? A Case Study of China

**T. Li, Pei Liu, Z. Li**

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- 15:20 An Approach to Calculate Electricity Costs for the German Industry for a System Efficient Design by Combining Energy Efficiency and Demand Response

**M. Stöckl, V. Selleneit, M. Philipp, U. Holzhammer**

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- 15:40 COFFEE BREAK (Veranda)
- 

**PYTHAGORAS HALL, OCTOBER 23<sup>RD</sup>**

SESSION 3.10

**WATER AND WASTEWATER MANAGEMENT**

CHAIRS: **Sharifah R. Wan Alwi, Likun Yuan**

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- 13:40 Water Distribution Networks Optimization Using Disjunctive Generalized Programming

**G. H. B. Cassiolato, E. P. Carvalho, J. A. Caballero, M. A. S. S. Ravagnani**

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14:00

### KEYNOTE LECTURE

Design of Property-based Water-using Networks with the Operator Potential Concept and a Linear Programming Approach

*L. Zhang, A.-H. Li, Z.-Y. Liu*

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14:40

Adsorption of Phenol from Wastewater Using Modified Layered Double Hydroxide Clay

*L. S. Tabana, R. P. Ledikwa, S. M. Tichapondwa*

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15:00

Heavy Metals Removal and Recovery from Hazardous Leather Sludge

*L. Pietrelli, N. M. Ippolito, A. P. Reverberi, M. Voccianti*

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15:20

Biological Remediation of Chromium (VI) in Aquifer Media Columns

*N. C. Mbonambi, E. M. N. Chirwa*

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15:40

COFFEE BREAK (Veranda)

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## ARCHIMEDES HALL, OCTOBER 23<sup>RD</sup>

SESSION 3.11

### MATERIALS

CHAIRS: **Chakib Bouallou, Bo Chen**

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16:00

Effects of Corrosion on the Microstructure, Hardness, and Microhardness of ASTM A335 P92 Steel

*J. Orozco, V. Kafarov, D. Peña*

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16:20

Catalyst Coatings Carriers Based on Boron-Silicon Glass Crystalline Compositions

*E. Krasnokutskiy, V. Ved, A. Suigenbayeva, A. Saipov, A. Mussabekov, H. Ponomarenko, H. Ved*

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16:40

Fabrication of a Hemispheric Patterned PDMS Stamp Using Polystyrene Beads and Its Application to Dye-Sensitized Solar Cells

*S.-H. Nam, D. I. Kim, J. W. Yang, J.-H. Yu, H. J. Seo, J. W. Lee, R. H. Jeong, Y. E. Gil, J.-H. Boo*

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17:00

Ni Impregnated into Hypercrosslinked Polystyrene for N-Methyl-D-Glucosamine Synthesis

*S. Mikhailov, V. Doluda, E. Sulman, N. Lakina, V. Matveeva, M. Sulman*

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20:30

**GALA-AWARDS DINNER** (Conference Centre)

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## DEMOCRITUS HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.12

#### SYSTEM ANALYSIS

CHAIRS: **Caliane B. B. Costa, Zhu Wang**

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- 16:00 Review of Mass Exchanger Network Synthesis Methodologies

*A. J. Isafiade, M. Short*

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- 16:20 Simplification of Data Acquisition in Process Integration Retrofit of a Milk Powder Production Facility

*R. Bergamini, T.-V. Nguyen, L. Bellomo, B. Elmegaard*

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- 16:40 Modelling Performance Evaluation of Microbial Desulphurization of Waterberg Steam Coal in CSTR

*S. S. Makgato, E. M. Chirwa-Nkhalambayausi*

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- 20:30 GALA-AWARDS DINNER (Conference Centre)
- 

## EUCLID HALL, OCTOBER 23<sup>RD</sup>

### SESSION 3.13

#### ENERGY MODELLING

CHAIRS: **Gbemi Oluleye, Yee Van Fan**

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- 16:00 Dry Reforming of Waste Polymers in Horizontal reactor to Syngas Production.

*M. Al-Asadi, N. Miskolczi, L. Gombor*

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- 16:20 Thermal Effects of Natural Gas and Syngas Co-Firing System on Heat Treatment Process in the Preheating Furnace

*P. Jozwiak, A. Kiedrzyńska, J. Hercog, D. Olevano, K. Badyda*

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- 16:40 Exhaust Gas Emission Reduction Through DME Engine Modification from Diesel Engine with Mechanical Type Injection System

*J. Jang, Y. Pyo, A. Ko, Y. Jung, Y. Woo, G. Kim, C. Cho*

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- 20:30 GALA-AWARDS DINNER (Conference Centre)
-

**THALES HALL, OCTOBER 23<sup>RD</sup>**

SESSION 3.14

**ENERGY DESIGN AND OPTIMISATION**

CHAIRS: **Abdoulmohammad G. Chofreh, Amir Tarighaleslami**

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- 16:00 Microbial Fuel Cell Power Output and Growth: Effect of pH on Anaerobic Microbe Consortium  
*T. E. Igboamalu, N. Bezuidenhout, M. T. Matsena, E. M. Nkhalambayausi-Chirwa*
- 16:20 Co-Production of 1,2-propandiol and Ethyl Lactate from the Conversion of Glycerol co-fed with Bio-Ethanol over Reduced Cu0.3Mg1.7Al LDH-derived Oxide Catalyst without External Hydrogen  
*J. Kuljiraseth, S. Jitkarnka*
- 16:40 Systematic Design of Post-Combustion Phase-Change Solvent-Based CO<sub>2</sub> Capture Processes  
*P. Kazepidis, A. I. Papadopoulos, P. Seferlis*
- 20:30 GALA-AWARDS DINNER (Conference Centre)
- 

**PYTHAGORAS HALL, OCTOBER 23<sup>RD</sup>**

SESSION 3.15

**SUSTAINABLE PROCESSING**

CHAIRS: **Marco Vociante, Xue-Chao Wang**

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- 16:00 Novel Alternative Production of Bio-Based Chemicals Via One Pot Glycerol and Bio-Ethanol Conversion Using Impregnated 1 %Pd/Mg2Al-LDO Derived Catalysts  
*T. Kumpradit, S. Jitkarnka*
- 16:20 Effective Ligandless Pd-containing Catalysts for Triple Bond Hydrogenation and Cross-Coupling in Environmentally Friendly Solvents  
*L. Z. Nikoshvili, E. M. Sulman, L. Kiwi-Minsker*
- 16:40 The Effect of Reaction Conditions on the Degradation of Phenol by UV/TiO<sub>2</sub> Photocatalysis  
*L. Jay, E. M. N. Chirwa*
- 20:30 GALA-AWARDS DINNER (Conference Centre)
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# GENERAL INFORMATION

## Registration Procedure

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Delegates may receive their registration package at the conference reception desk located at Level 4 of Hotel between 17:00-19:00 on Sunday October 20<sup>th</sup>. The reception desk will also be open for the registration of delegates on Monday October 21<sup>st</sup> from 8:00 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.

The badges of the Local Organizing Committee are blue coloured.

## Emergency Contact Numbers

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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

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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 “Daios Cove Resort” and enter as username “PRES19” and password “Crete”.

## Food & Beverage

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Refreshments and light snacks during the coffee breaks (Veranda area) and lunches (Pangea Restaurant – 3rd Level) are included in the registration fee. The delegates should show their badges before their entrance into the Hotel’s Restaurant.

## Instructions to Session Chairs

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- 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

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- 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 (equipped with MS Office 2016) 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

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- 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. Posters should be removed before 18:00 every day.

## Prizes and Awards

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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'19 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 23<sup>rd</sup>. Only personally presented winners will be awarded.

## Taxi / Bus

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Transportation from the Heraklion International Airport (HER) to Agios Nikolaos is possible by public bus (7.70 € per person) or taxi (about 90 € - taxi can accommodate up to 4 people depending on the luggage). Bus routes from the airport run every hour.

The Conference Venue Daios Cove Resort is about 15 minutes away by car from the city of Agios Nikolaos. A taxi ride from Agios Nikolaos to Daios Cove Resort costs about 18 € (a taxi can accommodate up to 4 people). Taxi can be called by contacting the Hotel Reception at the lobby area.

Public transportation is available throughout the day to the Hotel and the city of Agios Nikolaos. The bus stop is located just outside the hotel. The cost of a one-way bus ticket from the city of Agios Nikolaos to the Hotel is 1.20 €. Tickets can be purchased at the bus station. Seek travel information from the bus driver.

Shuttle bus service will be provided by the conference on a complementary basis between the city of Agios Nikolaos (and other nearby hotels) and the conference venue in the morning (before the sessions) and the afternoon (after the sessions) of the conference days.

## Social Programme

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The Welcome Party will take place at the Swimming pool Area on the 1<sup>st</sup> Level of Daios Cove Resort from 19:00 until 21:00. Light snacks and drinks will be offered to all conference attendants.

The Conference Gala-Awards dinner will take place at the Conference Center on the 4<sup>th</sup> Level of the Daios Cove Resort on Wednesday October 23rd, between 20:30pm and 24:00pm. 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'19 Best Poster Presentation Awards will be presented during the Gala-Awards Dinner.

# DAIOS COVE RESORT

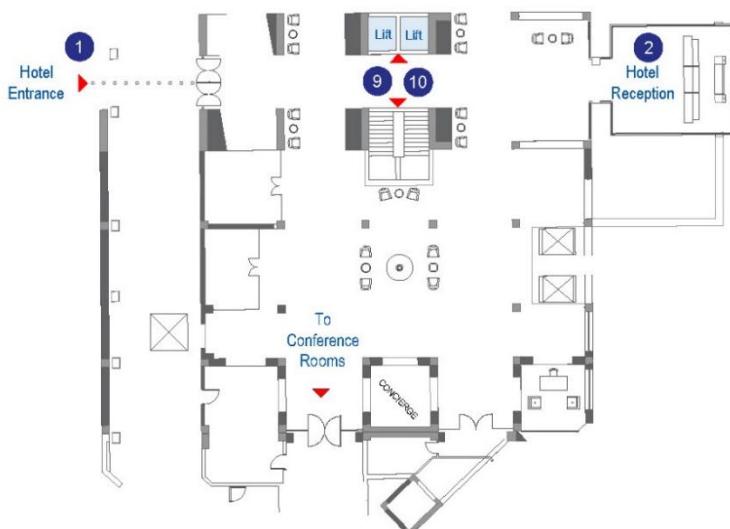
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10	Pangea Restaurant	Level 3
11	Veranda area	Level 4

# 22<sup>ND</sup> CONFERENCE PROCESS INTEGRATION, MODELLING OPTIMISATION FOR ENERGY SAVING AND POLLUTION REDUCTION



22<sup>ND</sup> CONFERENCE PROCESS INTEGRATION, MODELLING  
OPTIMISATION FOR ENERGY SAVING AND POLLUTION REDUCTION

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