



Second International Symposium on
**ENERGY CHALLENGES
& MECHANICS**

Conference Guide

Aberdeen, Scotland, UK | 19-21 August 2014

ARE YOU A SPEAKER?

The most accurate presentation times are posted outside each classroom, on our website, or can be checked at the Information Table. Be sure to double check your presentation time in case of last minute changes.

MY SESSION & LOCATION:

.....

.....

COVER PAGE IMAGE CONTEST

The winning image for ISECM's 2014 Cover Page was submitted by Herminio Martínez-García of the Technical University of Catalonia-BarcelonaTech, Spain. Congratulations, Herminio!

Presentation Titled:

The Use of Power DC-DC Converters and Gyrator Structures for Energy Processing in Photovoltaic Solar Facilities

CONTENTS

Letter from the Chairman	2
Schedule Overview	3
Schedule Notes	4
Social Programme	5
Need to Know	6
Conference Map	8
Opening & Closing Lecture	10
Principal Lectures	11
Session Topics	12
Parallel Session Timetables	13
Presentations	17
Organisers & Scientific Committee	40

WELCOME!

A Letter from the Chairmain

19 August 2014



Dear Distinguished Delegates,

It is an honour and great pleasure to welcome those involved with addressing the world's energy challenges to Aberdeen, Scotland, the energy capital of Europe.

Since James Watt, a Scottish inventor, invented the steam engine, human civilization relies more and more on a steady supply of energy. China's rise as an international superpower and a global energy crisis are challenging the world.

We are at a transitional age. On one hand, we see technology advances in the exploration and development of oil and gas—depleting resources. On the other hand, we see ideas and plans for new energy structures of the future. This symposium is about energy challenges—the underlying energetic basis (mechanics) for society—and involves multiple disciplines in technology, science, management and policy-making.

We will enjoy three days of discussion and lectures hosted by North Sea Conference & Journal. Topics include fossil fuels and many other forms of renewable energy. In addition, we will discuss issues related to energy efficiency, safety, environment and ecology.

This symposium is an excellent opportunity for networking and to learn the latest advances in the field. We are confident that you will benefit from the exciting range of topics and the high quality speakers representing 46 countries around the world.

Welcome To ISECM 2014!

A stylized, handwritten signature in black ink, appearing to be 'H. Tan'.

Dr. Henry Tan
Chairman, ISECM Conference
University of Aberdeen, UK

SCHEDULE OVERVIEW

DAY 1

TUE, 19 August 2014

REGISTRATION

8:00 - 9:10

Beechwood Suite

OPENING REMARKS

9:10 - 9:25

OPENING LECTURE

9:25 - 10:15

Cedar Suite

COFFEE BREAK

20 minutes

PARALLEL A

10:35 - 12:20

LUNCH

80 minutes

PARALLEL B

1:40 - 3:25

COFFEE BREAK

20 minutes

PARALLEL C

3:45 - 5:30

WELCOME RECEPTION

6:00 - 8:00

DAY 2

WED, 20 August 2014

PRINCIPAL LECTURES

8:30 - 9:20

Sycamore Suite

Beechwood Suite

COFFEE BREAK

20 minutes

PARALLEL D

9:40 - 11:25

LUNCH

65 minutes

SOCIAL PROGRAMME

12:30 - 7:00

Castle Tour

7:00 - 9:30

Conference dinner

DAY 3

THUR, 21 August 2014

PARALLEL E

8:30 - 10:15

COFFEE BREAK

20 minutes

PARALLEL F

10:35 - 12:20

LUNCH

80 minutes

PARALLEL G

1:40 - 3:25

COFFEE BREAK

20 minutes

CLOSING LECTURE

3:45 - 4:35

CLOSING REMARKS

4:35 - 4:45

Sycamore

SCHEDULE NOTES

Opening

Welcome! The ISECM opening remarks will be given by Dr. Henry Tan in Cedar Suite at 9:10 am. Prof. John A. Raven FRS FRSE Opening Lecture to follow. See page 10 for details.

Lunch

Each day, a lunch buffet will be provided for all ISECM delegates in the Catering Areas. Stickers on your badge will tell you which area to collect your lunch from. Find a seat in the Reception Foyer or Springfield's Restaurant and enjoy your meal. Lunch is not included for accompanying persons.

Welcome Reception

Come relax and network at the close of Day 1. Canapés, tea and coffee will be provided alongside a cash bar for additional beverages. All delegates, students and accompanying persons are welcome to attend.

Official Conference Photo

The official ISECM 2014 Group photo will be taken at 6:30p on Day 1 for all who wish to participate.

Principal Lectures

Principal lectures will be delivered simultaneously at 8:30am on Day 2. See page 11 for details.

Closing

Prof. Michael Kelly FRS FREng will give the closing lecture on Day 3 at 3:45 pm in the Sycamore Suite. Closing remarks by Dr. Henry Tan to follow. See page 10 for details.

SOCIAL PROGRAMME

MEET

All delegates who will attend the castle tour, **meet in the car park at 12:30pm** to board the coach buses. Buses will depart promptly at 12:45pm. ***Your name badge is your ticket, so don't forget to bring it!***

**Accompanying persons can pick up badges at the information table.*

CASTLE TOUR

12:30p, 20 August 2014



Glamis Castle

One of Scotland's most spectacular castles and the childhood Home of HM Queen Elizabeth, The Queen Mother. Glamis has been the ancestral home of the Earls of Strathmore for over 600 years. Situated in the foothills of the Angus Glens, is a living, breathing monument to Scottish hospitality; a place of enjoyment, reflection, laughter and wonder for all.

**Delegates will take part in a guided tour of the castle, an optional whiskey tasting and may explore the grounds. Participants should dress for all weather.*

CONFERENCE DINNER

7:00p, 20 August 2014



Join us

The conference dinner will be served as part of the social programme on Wednesday evening at our conference venue in the Cedar Suite. Attendees will enjoy a three course dinner and Scottish Highland Dance performance for the evening's entertainment. Join us for a relaxing night of discussion, networking, and fun.

**Dress is business casual. Student registration does not include the tour or dinner.*

NEED TO KNOW

General Notes to the Delegates

KEEP YOUR NAME BADGE!

Delegates **must** wear their badge for the entire conference. Your badge gives you access to the conference speaking sessions, lunch, and is your ticket to the social programme.

Badges are non-transferable. Persons who cannot provide a badge or use the badge of another participant will be asked to leave immediately.

NO SMOKING PLEASE



Our conference venue is 100% non-smoking. We thank you for smoking outside, away from entrances.

WIFI NETWORK

Our conference venue offers complimentary WIFI access, no password required. Select the network BT-OpenZone, open your browser, and click 'complementary' to browse for free.

CERTIFICATES + PROCEEDINGS

Do you require a Certificate of Attendance or Certificate of Presentation? These can be provided by request at the information table. All presentation abstracts and speaker bios are available on our website.

High quality papers will be selected for publication on the open access Journal of Energy Challenges and Mechanics, <http://www.nscj.co.uk/JECM/>

TRANSPORT IN ABERDEEN

BY BUS

First Bus 5 stops in front of the venue and connects to the city centre. Day tickets are 3.80 GBP or 4.20 GBP. Fares must be paid with exact change.

BY TAXI

The Conference Venue Address is:

HILTON ABERDEEN TREETOPS

161 SPRINGFIELD ROAD, ABERDEEN AB15 7AQ, UNITED KINGDOM

Rainbow City Taxis

T: 01224 878787

T: 01224 494949

Aberdeen Taxis

T: 01224 510121

SESSION ETIQUETTE

Moderators: Please arrive at your session early to collect and test presentation slides.

Speakers: Please arrive at your session early to test your slides or laptop. Limit presentation & discussion to your allocated time.

Audience: There are no photos permitted during presentations. We thank you for your cooperation.

Slide Copyright: All slides presented at ISECM 2014 are the sole property of each speaker and cannot be copied or redistributed without permission. Speakers are encouraged to delete their files at the conclusion of each session.

HOW TO USE THIS GUIDE

There are 20 Session Topics covered at this conference that are arranged into 7 Parallel Sessions (A-G). During each Parallel, there will be up to ten session slots you can choose to attend in different classrooms. Each slot will feature a group of presentations related to the same topic (see pages 17-39 for presentation details and locations)

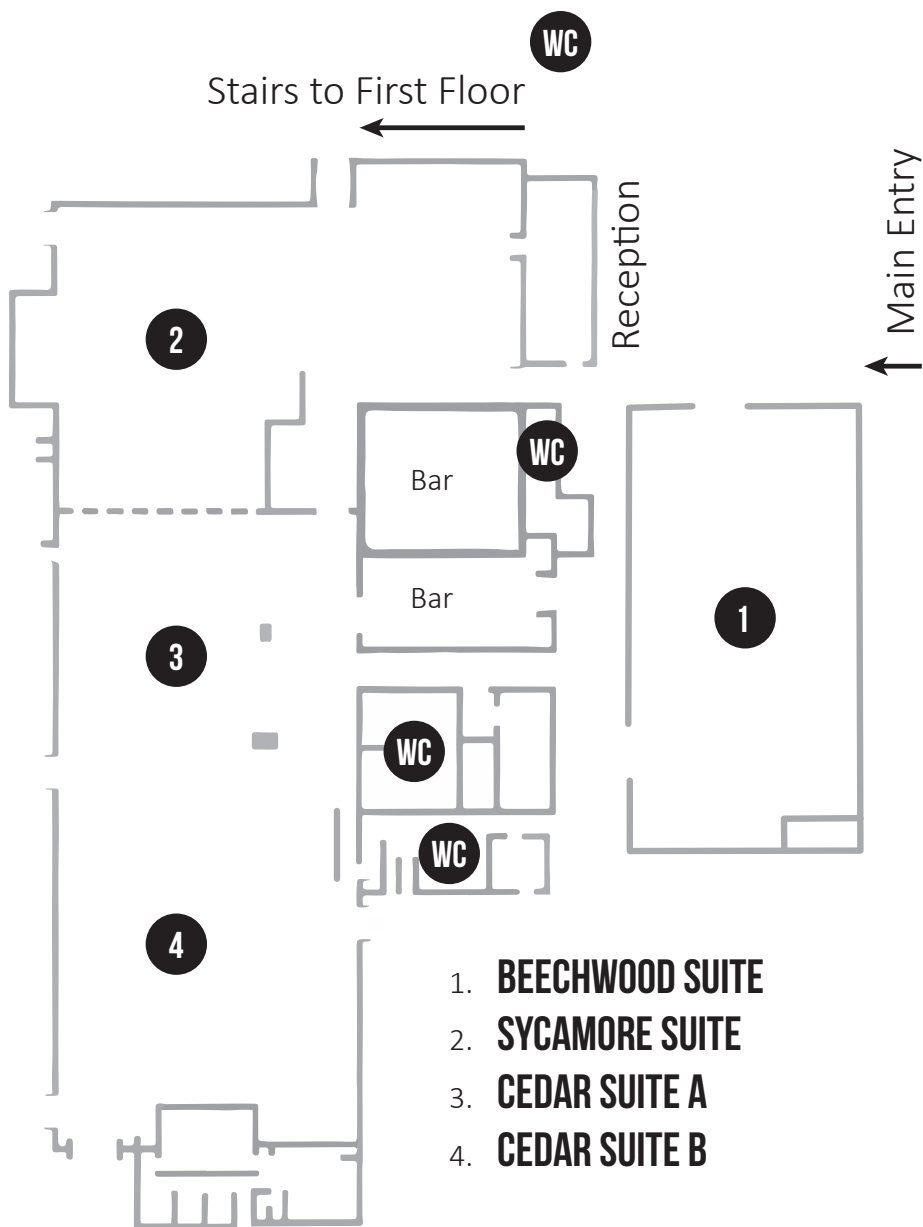
The Session Slots are named with a number and letter identifier. The number refers to The Session Topic (see page 12) and the letter indicates which Parallel the session will take place (see pages 13-16).



For example, Session Slot 01D means: the topic is 01: Shale Gas, Strategic Perspectives, and it will take place during Parallel D. You can find the room assignment on page 14, or the full details of this session slot in the 'Presentations - by Topic' section, starting from page 17.

CONFERENCE MAP

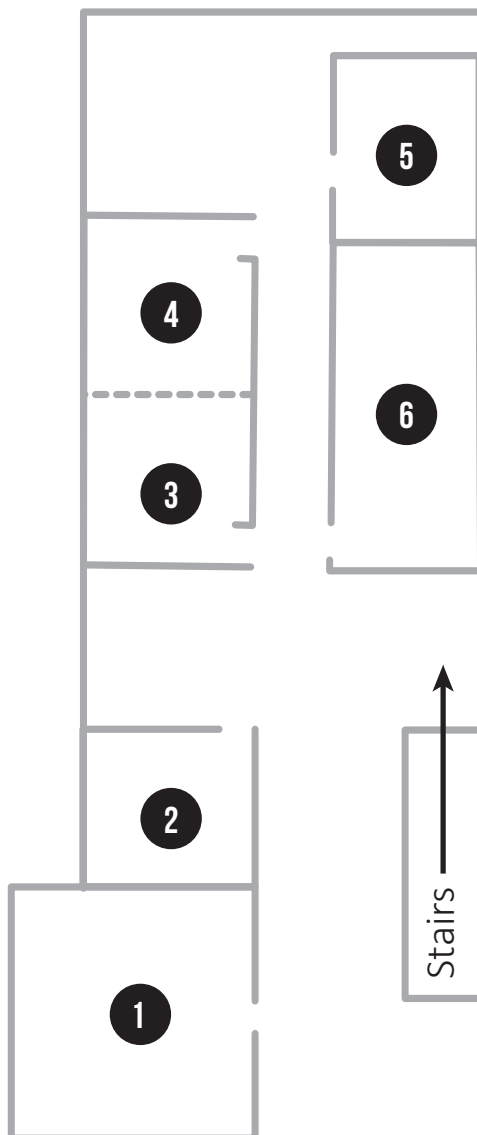
Ground floor



CONFERENCE MAP

First floor

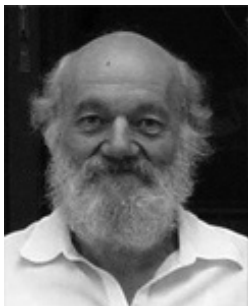
1. **ROWAN SUITE**
2. **MAPLE SUITE**
3. **OAK SUITE**
4. **ASH SUITE**
5. **ELM SUITE**
6. **PINE SUITE**



OPENING LECTURE

Time: 19 August 2014, 9:25-10:15

Location: Cedar suite



Possibilities of Enhanced Algal Biofuel Production Using Optimality, Pathway Modification & Waste

John A. Raven FRS FRSE

Honorary Life Member, British Phycological Society

Emeritus Professor, University of Dundee, United Kingdom

In response to their environment, algae in the wild may use an approximation to optimality of resource allocation in cellular structures, photosynthetic pigments, enzymes, transporters in membranes and RNAs, and in their genetic material. However, under controlled conditions, when algae are grown for biofuel (lipid) production for example, some of these processes can be altered to increase the efficiency of photosynthesis and therefore, lipid yield. This suggests that there is scope for selecting mutations and for genetic engineering at various levels in the photosynthetic apparatus with the aim of increasing efficiency of photon use and the rate of transformation of resources per unit biomass to prove biofuel yields.

Moderator: Dr Henry Tan, University of Aberdeen, UK

CLOSING LECTURE

Time: 21 August 2014, 3:45 - 4:35

Location: Sycamore Suite



Future Energy Needs and Engineering Reality

Michael Kelly FRS FREng

Prince Philip Professor of Technology, Department of Engineering

University of Cambridge, United Kingdom

"In reviewing the past 20 years in the context of plans to decarbonize the global economy, there is a serious lack of engineering reality assessment. Here I extract ten lessons from new technology introductions over the last 200 years and apply them to the decarbonisation project. No-one yet factors in the demographic consideration of peak population predicted for the period 2050-70 so that much new infrastructure may be needed for only 100 years at most.

Much of the investment over the last 30 years will be written off: we simply must be more sophisticated in our approach to decarbonisation than we have been to date."

Moderator: Dr Henry Tan, University of Aberdeen, UK

Location: Beechwood Suite



From Nanometers to Terawatts - Pending Breakthroughs in Materials for Energy

Pedro Gomez-Romero

CSIC Full Research Professor
Group Leader, NEO-Energy Lab, ICN2
Vice director MATGAS
Spain

Global warming was not a strong enough argument. But the compulsion for energy security and the end of cheap oil and are definitively adding to climate change concerns to finally boost a long overdue change towards a new and sustainable model of generation, management, storage and consumption of energy. [This lecture] will present a brief introduction to the overwhelming challenges we will have to face on our way to this sustainable energy model and the many lines of action that should be taken to tackle this problem.

Moderator: Prof. Yongli Gao, University of Rochester, USA

Location: Sycamore Suite



Energy Efficiency in Nature, from Individuals to Ecosystems

William Lewis

Professor of Biology
Director of the Center for Limnology
Interim Director of Renewable and Sustainable Energy Initiative at the Boulder Campus of the University of Colorado
Lifetime Member Associate of the US National Academy of Sciences, United States

Metabolic pathways for individual organisms and groups of organisms have evolved through natural selection for as much as 3 billion years. Thus, it may seem that the evolved biotic systems for capture and use of energy must approach the upper thresholds of efficiency with reference only to thermodynamic constraints. Nevertheless, information on energy efficiencies in nature shows surprisingly low efficiency for many processes.

Moderator: Dr. Sarah Baum, Thünen Institute of Rural Studies, Germany

SESSION TOPICS

The following topics will be arranged into the Parallel sessions. See page 13-16 for the parallel session room listings. See pages 17-39 for session details.

- 01:** Shale gas, strategic perspectives
- 02:** Photovoltaics
- 03:** Hydrogen storage and compression
- 04:** Solar Energy
- 05:** Geothermal energy
- 06:** Sustainable energy
- 07:** Energy future
- 08:** Energy and climate
- 09:** Energy policy
- 10:** Bioenergetics
- 11:** Flexible solar cells
- 12:** Thermo-solar systems
- 13:** Multiphysics simulation for energy applications
- 14:** Shale gas, technological perspectives
- 15:** Energy and ecosystems
- 16:** Greenhouse gas control technologies
- 18:** Grid Reliability and Power Transmission Technology
- 19:** Integrating renewable energy to the grid
- 21:** Enhanced oil recovery
- 22:** Renewable energy

PARALLEL SESSION TIMETABLES

PARALLEL A 19 August 2014, Tuesday, 10:35am-12:20pm

Session Slot	Room
02A	Ash suite (first floor)
03A	Cedar suite B (ground floor)
04A	Rowan suite (first floor)
05A	Oak suite (first floor)
06A	Beechwood suite (ground floor)
08A	Cedar suite A (ground floor)
10A	Sycamore suite (ground floor)
14A	Pine suite (first floor)
18A	Maple suite (first floor)

PARALLEL B 19 August 2014, Tuesday, 1:40pm-3:25pm

Session Slot	Room
04B	Cedar suite B (ground floor)
06B	Beechwood suite (ground floor)
08B	Cedar suite A (ground floor)
10B	Sycamore suite (ground floor)
15B	Rowan suite (first floor)
16B	Oak suite (first floor)
18B	Maple suite (first floor)

PARALLEL SESSION TIMETABLES

PARALLEL C 19 August 2014, Tuesday, 3:45pm-5:30pm

Session Slot	Room
03C	Cedar suite B (ground floor)
05C	Oak suite (first floor)
06C	Beechwood suite (ground floor)
07C	Cedar suite A (ground floor)
09C	Rowan suite (first floor)
10C	Sycamore suite (ground floor)
12C	Ash suite (first floor)
14C	Maple suite (first floor)
21C	Pine suite (first floor)

PARALLEL D 20 August 2014, Wednesday, 9:40am-11:25am

Session Slot	Room
01D	Rowan suite (first floor)
02D	Cedar suite B (ground floor)
06D	Beechwood suite (ground floor)
07D	Cedar suite A (ground floor)
13D	Oak suite (first floor)
14D	Sycamore suite (ground floor)
15D	Maple suite (first floor)
22D	Ash suite (first floor)

PARALLEL E 21 August 2014, Thursday, 8:30am-10:15am

Session Slot	Room
01E	Oak suite (first floor)
02E	Sycamore suite (ground floor)
04E	Rowan suite (first floor)
06E	Beechwood suite (ground floor)
07E	Cedar suite A (ground floor)
09E	Elm suite (first floor)
11E	Maple suite (first floor)
12E	Pine suite (first floor)
13E	Ash suite (first floor)
19E	Cedar suite B (ground floor)

PARALLEL F 21 August 2014, Thursday, 10:35am - 12:20pm

Session Slot	Room
03F	Cedar suite B (ground floor)
04F	Maple suite (first floor)
06F	Beechwood suite (ground floor)
07F	Rowan suite (first floor)
08F	Cedar suite A (ground floor)
09F	Oak suite (first floor)
10F	Sycamore suite (ground floor)
11F	Pine suite (first floor)
18F	Ash suite (first floor)
19F	Elm suite (first floor)

PARALLEL SESSION TIMETABLES

PARALLEL G 21 August 2014, Thursday, 1:40pm- 3:25pm

Session Slot	Room
01G	Rowan suite (first floor)
03G	Cedar suite B (ground floor)
06G	Beechwood suite (ground floor)
07G	Sycamore suite (ground floor)
08G	Cedar suite A (ground floor)
11G	Oak suite (first floor)
12G	Maple suite (first floor)
16G	Pine suite (first floor)
19G	Ash suite (first floor)
21G	Elm suite (first floor)

PRESENTATIONS - BY TOPIC

Session 01: SHALE GAS, STRATEGIC PERSPECTIVES

01D 20th August 2014, 9:40-11:25

Location: Rowan suite (first floor)

Moderator: Prof. Jonathan Williamson, Lycoming College, USA

- *The US shale energy boom and the price of fossil energy (30 minutes) - Paavo Suni, The Research Institute of the Finnish Economy (ETLA), Helsinki Finland*
- *Evolution of global shale gas and influences on China's natural gas supply (30 minutes) - Wenbin Lin, Tsinghua University, China*

01E 21st August 2014, 8:30-10:15

Location: Oak suite (first floor)

Moderator: Prof. Douglas B. Reynolds, University of Alaska Fairbanks, USA

- *The Complicated Tension Between Shale Gas Development, Housing, and Water and Sewer Infrastructure (30 minutes) - Prof. Jonathan Williamson, Lycoming College, USA*
- *Economic and Real Estate Perspectives of Shale Gas Development (30 minutes) - Dr. Clifford A. Lipscomb, Greenfield Advisors, USA*

01G 21st August 2014, 1:40-3:25

Location: Rowan suite (first floor)

Moderator: Paavo Suni, The Research Institute of the Finnish Economy, Finland

- *The New Oil to Natural Gas Price Ratio Paradigm (30 minutes) - Prof. Douglas B. Reynolds, University of Alaska Fairbanks, USA*
- *Emissions of natural gas production systems: current status and future research (30 minutes) - Prof. Sarah M. Joradan, University of Calgary Canada*

PRESENTATIONS - BY TOPIC

Session 02: PHOTOVOLTAICS

Chaired by: Prof. Yongli Gao, University of Rochester, USA

02A 19th August 2014, 10:35-12:20

Location: Ash suite (first floor)

Moderator: Prof. Saïd Sadki, University of Joseph Fourier Grenoble and CEA Grenoble, France

- *The Role of Molybdenum Oxide for Organic Electronics: Surface Analytical Studies (40 minutes)* - Prof. Yongli Gao, University of Rochester, USA
- *Novel multi-parameter nano-characterisation of organic solar cells (30 minutes)* - Dr. Fernando Araujo de Castro, National Physical Laboratory, UK
- *Influence of push-pull group substitution patterns on excited state properties of donor-acceptor co-monomers and their trimers (30 minutes)* - Dr. Remco W.A. Havenith, University of Groningen, The Netherlands; Ghent University, Belgium

02D 20th August 2014, 9:40-11:25

Location: Cedar suite B (ground floor)

Moderator: Dr. Remco W.A. Havenith, University of Groningen, The Netherlands; Ghent University, Belgium

- *Upconversion Photovoltaics: Challenges and Possible Solutions from Nanophotonics (30 minutes)* - Dr. Jose Marques-Hueso, Heriot-Watt University, UK
- *Low power photon up-conversion in multicomponent organic systems: photophysics and materials (30 minutes)* - Dr. Angelo Monguzzi, Kyushu University, Japan; Università degli Studi Milano-Bicocca, Italy
- *The role of CuI interlayer in small molecular organic photovoltaics (30 minutes)* - Prof. Hyo Jung Kim, Pusan National University, Korea

02E 21st August 2014, 8:30-10:15

Location: Sycamore suite (ground floor)

Moderator: Dr. Fernando Araujo de Castro, National Physical Laboratory, UK

- *New donor-acceptor alternating copolymers: preparation, physic-chemical characterization and application to organic photovoltaic cells (30 minutes)* - Prof. Saïd Sadki, University of Joseph Fourier Grenoble and CEA Grenoble, France
- *Structure-Property Relationships in Oligothiophene Derivatives for Efficient Organic Solar Cells (30 minutes)* - Christian Koerner, Technische Universität Dresden, Germany
- *Initial growth mode and nanostructures of a small molecular organic ZnPc:C60 bulk heterojunction (20 minutes)* - Hyun Hwi Lee, Pohang Accelerator Laboratory, Korea

Session 03: HYDROGEN STORAGE AND COMPRESSION

Chaired by:

Dr. Sofoklis Makridis, University of Bolton, UK

Prof. Jerry A. Darsey, University of Arkansas at Little Rock, USA

03A 19th August 2014, 10:35-12:20

Location: Cedar suite B (ground floor)

Moderator: Prof. Julio A. Alonso, University of Valladolid, Spain

- *Hydrogen storage and on-board generation for mobile applications (40 minutes)* - Prof. Emil Roduner, University of Stuttgart, Germany; University of Pretoria, South Africa
- *Metal borohydrides for high-capacity solid-state hydrogen storage (30 minutes)* - Prof. Hai-Wen Li, Kyushu University, Japan
- *The catalytic effect of carbon surfaces on H₂ dissociation on Al_n clusters by Density Functional Theory (30 minutes)* - Dr. Francesca Costanzo, Leiden Institute of Chemistry, The Netherlands

03C 19 August 2014, 15:45-17:30

Location: Cedar suite B (ground floor)

Moderator: Prof. Jerry A. Darsey, University of Arkansas at Little Rock, USA

- *Using hydrogen activated by microwave plasma vs. molecular hydrogen for hydrogen storage in tungsten disulfide inorganic nanotubes (30 minutes)* - Dr. Alla Zak, Holon Institute of Technology - HIT, Israel
- *Development of a Hydrogen Training Programme for the Welsh Energy Sector: Needs Analysis and Course Content (30 minutes) Abstract (30 minutes)* - Dr. Fan Zhang, University of South Wales, UK
- *Hydrogen storage/delivery systems based on HCOOH-amine/CO₂ cycles (20 minutes)* - Katerina Sordakis, Ecole Polytechnique Fédérale de Lausanne, Switzerland
- *Theoretical investigations on C₂H₄Nb complex as a potential hydrogen storage system, using Moller - Plesset (MP2) and Density Functional Theory (20 minutes)* - Dr. Altaf Hussain Pandith, University of Kashmir, India

PRESENTATIONS - BY TOPIC

03F 21st August 2014, 10:35-12:20

Location: Cedar suite B (ground floor)

Moderator: Prof. Emil Roduner, University of Stuttgart, Germany; University of Pretoria, South Africa

- *Use of Artificial Neural Networks and Density Functional Theory for the Prediction of Metal Hydride for Use in Hydrogen Storage (30 minutes)* - Prof. Jerry A. Darsey, University of Arkansas at Little Rock, USA
- *Hydrogen Desorption Kinetics of CeCl₃-doped Sodium Alanate Monitored in-situ Simultaneously by FTIR-ATR Spectroscopy and Gravimetry (30 minutes)* - Prof. Dr. Hans-Dieter Bauer, RheinMain University of Applied Sciences, Germany
- *Annealing effect on hydrogen storage property of Co-free La_{1.8}Ti_{0.2}MgNi_{8.7}Al_{0.3} alloy (20 minutes)* - Prof. Weiqing Jiang, Guangxi University, China
- *Design of a modular energy system for autonomous small scale applications with an on-board hybrid hydrogen production and storage approach "micro reactor integrated μ -PEM fuel cell system" (20 minutes)* - Arvind Balakrishnan, Albert-Ludwigs-Universitaet Freiburg, Germany

03G 21st August 2014, 13:40-15:25

Location: Cedar suite B (ground floor)

Moderator: Prof. Dr. Hans-Dieter Bauer, RheinMain University of Applied Sciences, Germany

- *Computer simulation of the adsorption and storage of hydrogen in nanoporous carbons (30 minutes)* - Prof. Julio A. Alonso, University of Valladolid, Spain
- *Implementation of a regenerator concept in a LIQHYSMES - LIQuid HYdrogen and Superconductive Magnetic Energy Storage (SMES) system used for buffering renewable energy production (30 minutes)* - Dr. Flavio Brighenti, Karlsruhe Institute of Technology, Germany
- *Growth and characterization of bamboo-like carbon nanotubes on Fe-Co-Cu catalysts prepared by high energy ball milling (20 minutes)* - Egon Kecsenovity, University of Szeged, Hungary
- *Hydrogen storage in clathrate hydrates and HF doped clathrate hydrates (20 minutes)* - Sukanta Mondal, Indian Institute of Technology, India

Session 04: SOLAR ENERGY

Chaired by: Prof. Pedro Gomez-Romero, CSIC/ICN2/MATGAS, Spain

04A 19th August 2014, 10:35-12:20

Location: Rowan suite (first floor)

Moderator: Prof. Pedro Gomez-Romero, CSIC/ICN2/MATGAS, Spain

- *Nano Materials for Light Harvesting Applications (30 minutes) - Prof. Amitava Patra, Indian Association for the Cultivation of Science, India*
- *Silination of TiO₂ Nanowire Array Electrodes in Dye-Sensitized Solar Cells for Higher Conversion Efficiency (30 minutes) - Prof. Feimeng Zhou, California State University, USA*

04B 19th August 2014, 1:40-3:25

Location: Cedar suite B (ground floor)

Moderator: Prof. Amitava Patra FRSC, Indian Association for the Cultivation of Science, India

- *Morphology Engineering of Porous Media for Enhanced Solar Fuel and Power Production (30 minutes) - Prof. Sophia Haussener, Ecole Polytechnique Fédérale de Lausanne, Switzerland*
- *Assessment of Capacity Factor and Dispatch Flexibility of Concentrated Solar Power Units (30 minutes) - Kilian Dallmer-Zerbe, Fraunhofer Institute for Solar Energy Systems, Germany*
- *Theoretical Modeling on Luminescent Down-Shifting Process – Relationship between Short Circuit Current Density Enhancement and Photophysical Properties of Luminescent Molecules (30 minutes) - Prof. Wen-Ji Dong, Washington State University, USA*

04E 21st August 2014, 8:30-10:15

Location: Rowan suite (first floor)

Moderator: Prof. Sophia Haussener, Ecole Polytechnique Fédérale de Lausanne, Switzerland

- *An Integrated Design Challenge for Students in Engineering and Architecture (30 minutes) - Prof. W. Mark McGinley, University of Louisville, USA*
- *Stepwise chemical information processing in dye-sensitized solar cells (30 minutes) - Dr. Norifusa Satoh, National Institute for Materials Science, Japan*
- *On the Near-Mid-IR HOMO-LUMO gap in amide linked porphyrin-rhodamine dyads (30 minutes) - José A. B. Ferreira, Universidade de Lisboa, Portugal*

PRESENTATIONS - BY TOPIC

04F 21st August 2014, 10:35-12:20

Location: Maple suite (first floor)

Moderator: Prof. Feimeng Zhou, California State University, Los Angeles, USA

- *Reduction in energy for home lighting in developing countries (30 minutes) - Prof. Paul O. Otasowie, University of Benin, Nigeria*
- *Single-Hidden Layer Artificial Neural Network for Solar Energy Potential Prediction Model in Indonesia: a Case Study in Southern Region of Sulawesi Island (30 minutes) - Andhika Prastawa, Agency for the Assessment and Application of Technology Republic of Indonesia, Indonesia*
- *R&D investment and strategy on PV in South Korea (30 minutes) - Noeon Park, Korea Institute of S& T Evaluation and Planning, Korea*

Session 05: GEOTHERMAL ENERGY

Chaired by: Riccardo Pasquali, GeoServ, Ireland

05A 19th August 2014, 10:35-12:20

Location: Oak suite (first floor)

Moderator: Alessandro Bozzoli, Scientific and Technological Research Centre, Italy

- *Fiber-optic DTS system applications in the research of geothermal energy (30 minutes) - Prof. Dr. Vladimír Vasínek, Technical University of Ostrava, Czech Republic*
- *Synergies among CO₂-CH₄ geological storage and geothermal energy: underground potential evaluation for strategic energy mix plans (20 minutes) - Dr. Monia Procesi, Istituto Nazionale di Geofisica e Vulcanologia, Italy*
- *The thermal interferences caused by groundwater heat pumps in urban environments (20 minutes) - Alejandro García-Gil, University of Zaragoza; GHS, Spain*
- *Heat Transfer Model Design Method and Experimental Study for Geothermal Heat Exchange Tubes in Diaphragm Walls (20 minutes) - Dr. Meng Sun, China University of Mining and Technology, China*

05C 19 August 2014, 3:45 - 5:30

Location: Oak suite (first floor)

Moderator: Prof. Dr. Vladimír Vasínek, Technical University of Ostrava, Czech Republic

- *A Temperature Monitoring System for Geothermal Boreholes (30 minutes) - Alessandro Bozzoli, Scientific and Technological Research Centre, Italy*

- *Minewater 2.0 project in Heerlen the Netherlands: transformation of a geothermal mine water pilot project into a full scale hybrid sustainable energy infrastructure for heating and cooling (20 minutes)* - René Verhoeven, Mijwater BV, The Netherlands
- *Acid stimulation of geothermal wells in Mexico, El Salvador and the Philippines (20 minutes)* - Lilibeth Morales, Gerencia de Proyectos Geotermoeléctricos, México
- *Mine water energy as potential source for heat pumps (20 minutes)* - Veiko Karu, Tallinn University of Technology, Estonia

Session 06: SUSTAINABLE ENERGY

Chaired by:

Dr. Arun Jhaveri, Senior Energy Adviser, USA

Prof. Dr.-Ing. Hermann-Josef Wagner, Ruhr-Universität Bochum (RUB), Lehrstuhl Energiesysteme und Energiewirtschaft (LEE), Germany

06A 19th August 2014, 10:35-12:20

Location: Beechwood suite (ground floor)

Moderator: Prof. Dr.-Ing. Hermann-Josef Wagner, Lehrstuhl Energiesysteme und Energiewirtschaft (LEE), Germany

- *Fossil Fuel Energy Savings, Carbon Sequestration, and Biodiversity Conservation through Innovative Wood Construction and Diverse Forest Management (40 minutes)* - Prof. Chadwick Dearing Oliver, Yale University, USA
- *Assessing the potential for tree biomass to meet urban energy demand and reduce carbon emissions in Michigan, USA (30 minutes)* - Prof. David W. MacFarlane, Michigan State University, USA
- *Validating Sustainable Building Design Concepts Utilizing Energy Modeling (30 minutes)* - Lawrence Maxwell AIA, Spacecoast Architects PA, USA

06B 19 August 2014, 1:40 - 3:25

Location: Beechwood suite (ground floor)

Moderator: Prof. Chadwick Dearing Oliver, Yale University, USA

- *Magnesium recycling society with lasers pumped by natural energy (40 minutes)* - Prof. Takashi Yabe, Tokyo Institute of Technology, Energy Genesis Cycle (EGC) Inc, Japan
- *Sustainable Energy Policy in the Arabian (Persian) Gulf: Paradox or Progress? (30 minutes)* - Prof. Alan S. Weber, Weill Cornell Medical College in Qatar, Qatar
- *Improving Energy Efficiency in Water Infrastructure using Micro-hydropower Energy Recovery: Opportunities & Challenges (20 minutes)* - Jennifer Brady, Trinity College Dublin, Ireland

PRESENTATIONS - BY TOPIC

06C 19 August 2014, 3:45 - 5:30

Location: Beechwood suite (ground floor)

Moderator: Dr. John C. Gordon, Los Alamos National Laboratory, USA

- *Implementation of wind energy and photovoltaic – aspects of sustainability (40 minutes) - Prof. Dr.-Ing. Hermann-Josef Wagner, Ruhr-Universität Bochum (RUB); Lehrstuhl Energiesysteme und Energiewirtschaft (LEE), Germany*
- *Management optimisation and technologies application: a right approach to balance energy saving need and process goals – some Italian case studies (30 minutes) - Dr. Luigi Falletti, University of Padova, Italy*
- *Design requirements for a sustainable energy heat engine (30 minutes) - Geoff Angel, University of Hertfordshire, UK*

06D 20th August 2014, 9:40-11:25

Location: Beechwood suite (ground floor)

Moderator: Prof. Jussi Uusivuori, Finnish Forest Research Institute Metla, Finland

- *Energy supply chain synthesis involving multi-period operations (30 minutes) - Prof. István Heckl, University of Pannonia, Hungary*
- *Benchmarking Energy Management Systems for UAE Metro Stations (20 minutes) - Samira Rajabi, The American University of Sharjah, UAE*
- *Steam reforming of renewable glycerol for hydrogen and nano-carbon material (20 minutes) - Dr. Chunfei Wu, University of Leeds, UK*
- *Moving towards a sustainable energy future: A case study of terrestrial wind energy development and wildlife (20 minutes) - Steven M. Grodsky, North Carolina State University, USA*

06E 21st August 2014, 8:30-10:15

Location: Beechwood suite (ground floor)

Moderator: Dr. Julia Nesheiwat, Department of State, USA

- *Upgrading Renewable and Sustainable Carbohydrates into High Energy Density Fuels (40 minutes) - Dr. John C. Gordon, Los Alamos National Laboratory, USA*
- *Sustainable Energy in ICT Industry: Supplying Mobile Networks with RES (20 minutes) - Dr. Paolo Dini, Centre Tecnologic de Telecomunicacions de Catalunya, Spain*
- *Modelling small domestic power plants as a future potential of global sustainable energy systems (20 minutes) - Prof. Attila Magyar, University of Pannonia, Hungary*
- *FRTC piping technologies for a sustainable transportation and storage of fluid energy sources (20 minutes) - Tido Peters, Fraunhofer Institute for Production Technologies, Germany*

06F 21st August 2014, 10:35-12:20

Location: Beechwood suite (ground floor)

Moderator: Prof. István Heckl, University of Pannonia, Hungary

- *About Carbon Neutrality of Forest Based Energy (30 minutes) - Prof. Jussi Uusivuori, Finnish Forest Research Institute Metla, Finland*
- *Towards a holistic sustainability assessment tool for bioenergy using the Global Bioenergy Partnership (GBEP) sustainability indicators (30 minutes) - Dr. Takashi Hayashi, Ministry of Agriculture, Forestry and Fisheries, Japan*
- *The Brazilian Economical, Social and Environmental Sustainability Applied to the Eletrobras Holding in the Hidro-electric Generation Sector (20 minutes) - Kalink Shangred Silva Almeida, University of Beira Interior, Portugal*
- *Experimental Study of Methane Hydrates Recovery Combining CO₂ Replacement and Depressurization (20 minutes) - Dr. Jiafei Zhao, Dalian University of Technology, China*

06G 21st August 2014, 1:40 - 3:25

Location: Beechwood suite (ground floor)

Moderator: Dr. Takashi Hayashi, Ministry of Agriculture, Forestry and Fisheries, Japan

- *Sustainable development and Sen's capabilities approach (30 minutes) - Dr. Holger Schlör, Institute of Energy and Climate Research (IEK-STE), Forschungszentrum Jülich, Germany*
- *Japan's post-Fukushima reconstruction: A case study for implementation of sustainable energy technologies (30 minutes) - Dr. Julia Nesheiwat, U.S. Department of State, USA*
- *Scientific perspicacity must not ignore suitable developing countries for production of economically viable second and third generations biofuels (20 minutes) - Prof. Dr. Javed Iqbal Qazi, University of the Punjab, Pakistan*
- *Opportunities and barriers for CO₂ emissions reduction in non-ferrous metals secondary production and semi-fabrication in developing countries (30 minutes) - Prof. Juan C. González Palencia, Gunma University, Japan*

PRESENTATIONS - BY TOPIC

Session 07: ENERGY FUTURE

07C 19 August 2014, 3:45 - 5:30

Location: Cedar suite A (ground floor)

Moderator: Prof. Jailson B. de Andrade, Federal University of Bahia, Brazil

- *Photocatalytic Water Oxidation and Reduction with Earth-Abundant Metal Catalysts (40 minutes) - Prof. Shunichi Fukuzumi, Osaka University, Japan*
- *Technological trajectories for a low carbon future (30 minutes) - Dr. Sandrine Selosse, MINES ParisTech, France*
- *Energy saving at work - and when not working (30 minutes) - Prof. Dr. Gunnar Stevens, University of Siegen, Germany*

07D 20th August 2014, 9:40-11:25

Location: Cedar suite A (ground floor)

Moderator: Prof. Ziyad Salameh, University of Massachusetts Lowell, USA

- *Challenges in Energy (40 minutes) - Prof. Jailson B. de Andrade, Federal University of Bahia; National Institute of Science and Technology for Energy and Environment, Brazil*
- *Micro-sized Microbial Fuel Cell for Sustainable Future (30 minutes) - Dr. Jhonathan Rojas, King Abdullah University of Science and Technology, Saudi Arabia*

07E 21st August 2014, 8:30-10:15

Location: Cedar suite A (ground floor)

Moderator: Dr. Hiroshi Fujiwara, BroadBand Tower, Inc. / Internet Research Institute, Inc., Japan

- *Fundamentals of Energy Systems Transformation (40 minutes) - Prof. Jürgen-Fr. Hake, Institute of Energy and Climate Research (IEK-STE), Forschungszentrum Jülich, Germany*
- *Scalable Microbial Fuel Cell architecture for direct electrical energy recovery from wastewaters (30 minutes) - Prof. Dr. Ing. Andrea G. Capodaglio, University of Pavia, Italy*
- *Exploring the applicability of 'energy-return-on-investment' to desert greening and other large-scale human alterations to the Earth (20 minutes) - Simon Bowring, Wageningen University and Research Centre, The Netherlands*

07F 21st August 2014, 10:35-12:20

Location: Rowan suite (first floor)

Moderator: Prof. Jürgen-Fr. Hake, Institute of Energy and Climate Research, Forschungszentrum Jülich, Germany

- *Renewable Energy Sources and their Impact on the Utility Companies (40 minutes) - Prof. Ziyad Salameh, University of Massachusetts Lowell, USA*
- *Estimating the Cost of Future Global Energy Supply (30 minutes) - Prof. Jan Petter Hansen, University of Bergen, Norway*
- *Harnessing bioenergy of biochar from biomass wastes towards enhancing sustainable agriculture (20 minutes) - Prof Madya, Dr Zainab Hamzah, Universiti Malaysia Perlis, Malaysia*

07G 21st August 2014, 1:40 - 3:25

Location: Sycamore suite (ground floor)

Moderator: Prof. Shunichi Fukuzumi, Osaka University, Japan

- *Super-mature, society: Energy business for sustainable future (30 minutes) - Dr. Hiroshi Fujiwara, BroadBand Tower, Inc. / Internet Research Institute, Inc. ,Japan*
- *Energy resource acquisition, distribution and end-use and the growth of industrial society: A global systems perspectiv (30 minutes) - Dr. Andrew Jarvis, Lancaster University, UK*
- *Sustainable Development and the Transformation of Energy Systems– Lessons from the German “Energiewende (30 minutes) - Dr. Christoph Weckenbrock, Institute for Energy and Climate Research (IEK-STE), Forschungszentrum Jülich, Germany*

Session 08: ENERGY AND CLIMATE

Chaired by: Prof. Jian-lei Niu, Hong Kong Polytechnic University, Hong Kong

08A 19 August 2014, 10:35-12:20

Location: Cedar suite A (ground floor)

Moderator: Prof. Milun J. Babic, University of Kragujevac, Serbia

- *Key technologies and integrative design for low-energy buildings (30 minutes) - Prof. Jian-lei Niu, Hong Kong Polytechnic University, Hong Kong, China*
- *A calculation method for the annual thermal heating requirement of farrowing units (30 minutes) - Markus Sax, Agroscope Institute for Sustainability Sciences ISS Tänikon, Switzerland*

PRESENTATIONS - BY TOPIC

08B 19 August 2014, 1:40-3:25

Location: Cedar suite A (ground floor)

Moderator: Prof. Jian-lei Niu, Hong Kong Polytechnic University, Hong Kong, China

- *About creation and reached goals of development policy in the area of energy efficiency, environmental protection and sustainable development in the city of Kragujevac, Serbi (40 minutes)* - Prof. Milun J. Babic, University of Kragujevac, Serbia
- *The Extended Envelope - How integrating landscape strategies with building systems can contribute to a zero carbon built environment (30 minutes)* - Dr. Steven A. Sandifer, California State Polytechnic University, USA
- *Performance analysis of heating systems for low energy houses (30 minutes)* - Philippe Rivière, CES, Mines ParisTech, France

08F 21 August 2014, 10:30-12:10

Location: Cedar suite A (ground floor)

Moderator: Prof. Michael Kelly FRS FREng, University of Cambridge, UK

- *Hydrothermal carbonisation as an energy-efficient alternative to thermal drying of sewage sludge (40 minutes)* - Prof. Dr. Rolf Krebs, ZHAW Zurich University of Applied Sciences, Switzerland
- *The Effects of Future Climate Change on Energy Consumption in Residential Buildings in China and Counteracting Retrofitting Measures (30 minutes)* - Dr. David H. C. Chow, University of Liverpool, UK
- *Evaluation of a Business Process Modelling (BPM) in a real pilot site as an energy saving measure (20 minutes)* - María Eguaras-Martínez, Universidad de Navarra, Campus Universitario, Spain

08G 21 August 2014, 1:40 - 3:25

Location: Cedar suite A (ground floor)

Moderator: Prof. Dr. Rolf Krebs, ZHAW Zurich University of Applied Sciences, Switzerland

- *Low energy – low carbon acute hospital design in the UK: An analysis of In-us (30 minutes)* - Prof. Matthew Bacon, University of Salford, UK
- *Energetic Optimization of Buildings – a Quest for Sustainable Future (30 minutes)* - Dr. Árpád Csík, Széchenyi István University, Hungary
- *Anthropogenic heat emissions in the Yangtze River Delta regio (20 minutes)* - Yan Lu, Nanjing University, China

Session 09: ENERGY POLICY

09C 19th August 2014, 3:45-5:30

Location: Rowan suite (first floor)

Moderator: Prof. Gustavo Viniegra-González, Universidad Autónoma Metropolitana, Mexico

- *Analysis of Changing Geopolitics and Supply: From Energy Status Quo to Sustained Energy Security (30 minutes) - Moty Kuperberg, Dynamic Shipping Services, Israel*
- *Policy Impact on Concentrated Solar Power Technology Deployment: Experience of Global Environment Facility (30 minutes) - Dr. Ming Yang, The World Bank Group, USA*
- *Integrating climate change into renewable energy policy: the Portuguese case (30 minutes) - Maria João Coelho, University Institute of Lisbon, Portugal*

09E 21st August 2014, 8:30-10:15

Location: Elm suite (first floor)

Moderator: Dr. Hyun Joon Chang, Korea Advanced Institute of Science and Technology, Korea

- *The role of innovation and economic network symmetry as modulators of economic energy intensity and human development (30 minutes) - Prof. Gustavo Viniegra-González, Universidad Autónoma Metropolitana, Mexico*
- *The determinants of household energy demand in rural Beijing: Can environmentally friendly technologies be effective? (30 minutes) - Jingchao Zhang, Tsinghua University, China*
- *Low-carbon policy in Poland - the challenges of transformation (30 minutes) - NSylwia Talik, Electrotechnical Institute, Poland*

09F 21st August 2014, 10:35-12:20

Location: Oak suite (first floor)

Moderator: Moty Kuperberg, Dynamic Shipping Services, Israel

- *Optimal Energy Mix of Korean Micro-grid in Jeolla-do (30 minutes) - Dr. Hyun Joon Chang, Korea Advanced Institute of Science and Technology, Republic of Korea*
- *Energy, Climate and Water Policy Modeling in U.S. Northeast Corridor Regional Earth System Model (NERESM) - Complexity, Scales, and the Intersection of Modeling Domains (30 minutes) - Vatsal Bhatt, Brookhaven National Laboratory, USA*

PRESENTATIONS - BY TOPIC

Session 10: BIOENERGETICS

Chaired by: John A Raven FRS FRSE, University of Dundee, UK

10A 19th August 2014, 10:35-12:20

Location: Sycamore suite (ground floor)

Moderator: Ronald C. Pate, Sandia National Laboratories, USA

- *Production of Biofuels and Biominerals by Microalgae (30 minutes) - Prof. Yoshihiro Shiraiwa, University of Tsukuba; CREST/JST, Japan*
- *Cytochrome c as an electron acceptor of nanostructured titania and hematite conduction bands (30 minutes) - Prof. Iseli L. Nantes, Universidade Federal do ABC, Brazil*
- *Developments in the Sustainable Production of Algal Biofuels (30 minutes) - Andre DuPont, United States Environmental Protection Agency, USA*

10B 19 August 2014, 1:40-3:25

Location: Sycamore suite (ground floor)

Moderator: Prof. Iseli L. Nantes, Universidade Federal do ABC, Brazil

- *Resource Requirements for Large Scale Production of Algae Biofuels (30 minutes) - Ronald C. Pate, Sandia National Laboratories, USA*
- *Residual light and high light effects: opportunities, challenges and methods for deploying harsh resources for microalgal cultivation (30 minutes) - Dr. Agnese Cicci, Sapienza University of Rome, Italy*
- *Chlorosulfonic Acid Modified Zirconia as Efficient Catalyst for Biodiesel Production (30 minutes) - Dr. Ka-Fu Yung, The Hong Kong Polytechnic University, Hong Kong*

10C 19 August 2014, 3:45-5:30

Location: Sycamore suite (ground floor)

Moderator: Prof. Yoshihiro Shiraiwa, University of Tsukuba, Japan

- *Bacterial diversity dynamics in biofuel algal cultures grown in municipal wastewaters (30 minutes) - Prof. Adrian Unc, Memorial University of Newfoundland, Grenfell Campus, Canada; University of Leeds, UK; New Mexico State University, USA*
- *Exploring the potential of microalgae for bioenergy production (30 minutes) - Dr Frank Baganz, University College London, UK*
- *Mineral and non-carbon utilization and recovery during sequential photoautotrophic-heterotrophic growth of lipid-rich algae (20 minutes) - Pavlo Bohutskyi, Johns Hopkins University, USA*

10F 21st August 2014, 10:35-12:20

Location: Sycamore suite (ground floor)

Moderator: Prof. Adrian Unc, Memorial University of Newfoundland, Canada

- *Advanced biofuels through microbial bioprospecting and chemical upgrading (30 minutes) - Dr. Christopher J. Chuck, University of Bath, UK*
- *Prerequisite for highly efficient isoprenoid production by cyanobacteria discovered through the over-expression of 1-deoxy-D-xylulose 5-phosphate synthase and carbon allocation analysis (30 minutes) - Prof. Masaki Ihara, Shinshu University; Japan Science and Technology Agency, Japan*
- *Conversion of lignocellulosic biomass to hydrocarbon fuels via hydroprocessing: case study for eight high-volume U.S. feedstocks (20 minutes) - Daniel Carpenter, National Renewable Energy Laboratory, USA*
- *Enhancing the production of biodiesel precursors in Escherichia coli using enzymes from deep-sea bacteria (20 minutes) - Carlos Rullán-Lind, University of Puerto Rico, Puerto Rico*

Session 11: FLEXIBLE SOLAR CELLS

Chaired by:

Prof. Cezhou Zhao, Xi'an Jiaotong - Liverpool University, China

Dr. M. (Adriana) Creatore, Eindhoven University of Technology, The Netherlands

11E session 11E, 21st August 2014, 8:30-10:15

Location: Maple suite (first floor)

Moderator: Dr. Adriana Creatore, Eindhoven University of Technology, The Netherlands

- *Microwave Assisted Flexible & Printable DSSC (30 minutes) - Prof. Satoshi UCHIDA, The University of Tokyo, Japan*
- *Woven Electrodes for Flexible Organic Solar Cells (30 minutes) - Dr. Roland Hany, Swiss Federal Laboratories for Materials Science and Technology, Switzerland*
- *Integration of flexible solar cells on wearable textile antennas (20 minutes) - Sam Lemey, iMinds/Ghent University, Belgium*

PRESENTATIONS - BY TOPIC

11F 21st August 2014, 10:35-12:20

Location: Pine suite (first floor)

Moderator: Prof. Michael C. Flickinger, North Carolina State University, USA

- *Anneal effects on active layer in flexible organic solar cells with ruthenium complex sensitizer and gold nanoparticles (20 minutes)* - Prof. Lung-Chien Chen, National Taipei University of Technology, Taiwan
- *Planar vs non-planar pi-conjugated semiconductive molecules: on the potential of anthracene-based aryl acetylenes and helically-shaped quinone derivatives in organic solar cells (30 minutes)* - Prof. Assunta Marrocchi, University of Perugia, Italy
- *Technology challenge of substrate configurations in CdTe thin film solar cells (20 minutes)* - Jingjin Wu, University of Liverpool, UK

11G 21st August 2014, 1:40-3:25

Location: Oak suite (first floor)

Moderator: Prof. Satoshi Uchida, The University of Tokyo, Japan

- *Flexible Biocomposites of Living Cells for Solar Energy Harvesting, Production of H₂ Gas and Recycling of Gas-Phase Carbon to Fuels (30 minutes)* - Prof. Michael C. Flickinger, North Carolina State University, USA
- *Atomic layer deposition of highly transparent platinum counter-electrodes for back-side illuminated flexible dye-sensitized solar cell (30 minutes)* - Dr. M. (Adriana) Creatore, Eindhoven University of Technology, The Netherlands

Session 12: THERMO-SOLAR SYSTEMS

Chaired by:

Prof. David Carroll, Wake Forest University, USA

Prof. Xiangang Luo, Chinese Academy of Sciences, China

12C 19 August 2014, 3:45-5:30

Location: Ash suite (first floor)

Moderator: Prof. Lukas Ferkel, Czech Technical University, Czech Republic

- *Impact of different physical processes on salt-gradient solar pond performance: numerical and experimental investigations (30 minutes)* - Prof. Francisco Suárez, Pontificia Universidad Católica de Chile, Chile
- *Techno-economic Analysis of high performance novel hybrid MSF-FO/NF Desalination Plant (30 minutes)* - Dr. Abdel Nasser Abou Khlewa, Qatar Environmental & Energy Research Institute, Qatar

- *Concentrating solar power (CSP) system integrated with MED-RO hybrid desalination (20 minutes)* - Dr. Annarita Salladini, Processi Innovativi, Italy
- *Approach to energy efficiency of prototype of solar thermal systems in the ironing process and evaporation of water with square and curved concentrator (20 minutes)* - Prof. Emerson Rojas, Instituto Tecnológico de Soledad Atlántico, Colombia

12E 21 August 2014, 8:30-10:15

Location: Pine suite (first floor)

Moderator: Prof. Francisco Suárez, Pontificia Universidad Católica de Chile, Chile

- *Thermal-Photovoltaic Hybrids: New Geometrie (40 minutes)* - Prof. David Carroll, Wake Forest University, USA
- *A Pilot-scale Demonstration of a Novel Solar Photovoltaic/thermal (PV/T) System and its Scenarios for Future Development (20 minutes)* - Dr. Xingxing Zhang, University of Hull, UK
- *Electricity production by solar thermo-hydraulic engine for residential use (20 minutes)* - Rémy Borgogno, Université de Perpignan Via Domitia, France
- *CFD modelling of biomass fast pyrolysis in a solar trough receiver/reactor (20 minutes)* - Muktar Bashir, Aston University, UK

12G 21st August 2014, 1:40-3:25

Location: Maple suite (first floor)

Moderator: Prof. David Carroll, Wake Forest University, USA

- *Model-Based Predictive Control for Buildings: Five Years in Full Operation (30 minutes)* - Prof. Lukas Ferkl, Czech Technical University, Czech Republic
- *Forthcoming Grand Minimum of the total solar irradiance leads to the Little Ice Age (30 minutes)* - Habibullo Abdussamatov, Pulkovo observatory of the RAS, Russia
- *State-of-the-art approach of using thermal oil through external superheating with biomass to increase the efficiency of parabolic trough plants (20 minutes)* - Dr. Amir Tadros, Laing O'Rourke, Australia
- *Fuel production by solar concentrating technologies (20 minutes)* - Dr. Martin Roeb, German Aerospace Center - DLR, Solar Research, Germany

PRESENTATIONS - BY TOPIC

Session 13: MULTIPHYSICS SIMULATION FOR ENERGY APPLICATIONS

Chaired by: Prof. Marcelo Dapino, The Ohio State University, USA

13D 20 August 2014, 9:40-11:25

Location: Oak suite (first floor)

Moderator: Prof. Giedrius Janušas, Kaunas University of Technology, Lithuania

- *Multiphysics modelling and design of optimized magnetostrictive energy harvesters (40 minutes) - Prof. Marcelo Dapino, The Ohio State University, USA*
- *Experimental study and modelling of calendar ageing of lithium-ion batteries for EV and HEV applications: SIMCAL Project (30 minutes) - Dr. Philippe Gyan, Renault; Battery Innovations, France*
- *GASFLOW Simulations for Cryogenic Tank Loss of Vacuum Scenarios (30 minutes) - Daniela Piccioni Koch, Karlsruher Institut für Technologie, Germany*

13E 21 August 2014, 8:30-10:15

Location: Ash suite (first floor)

Moderator: Prof. Marcelo Dapino, Ohio State University, USA

- *Modeling, identification, validation and control of a hybrid maglev ball (30 minutes) - Prof. Thomas Alberts, Old Dominion University, USA*
- *Hybrid Numerical-Experimental Investigation of Working Regimes of Vibroactive Pad (30 minutes) - Prof. Giedrius Janušas, Kaunas University of Technology, Lithuania*

Session 14: SHALE GAS, TECHNOLOGICAL PERSPECTIVES

Chaired by: Volker Spieth, VS.GLOBALMETAL LLC, Consultancy and Project Management, USA

14A 19 August 2014, 10:35-12:20

Location: Pine suite (first floor)

Moderator: Volker Spieth, VS.GLOBALMETAL LLC, Consultancy and Project Management, USA

- *Optimizing ultimate yield in unconventional oil and gas (40 minutes) - Dr. Frank D. Mango, Petroleum Habitats, USA*
- *Stress-dependent permeability of two-solid constituent model of gas shales (30 minutes) - Dr. Mikhail Geilikman, Shell International Exploration and Production Inc., USA*

14C 19 August 2014, 3:45-5:30

Location: Maple suite (first floor)

Moderator: Dr. Frank D. Mango, Petroleum Habitats, US

- *Utilization of Petroleum Geochemical Concepts in Characterization of Shale Oil Prospects (30 minutes) - Prof. Richard Paul Philp, University of Oklahoma, USA*
- *The potential of China's lacustrine shale gas resources (30 minutes) - Dr. Lamei Lin, China University of Petroleum (East China), China*
- *A multi-scale, multi-physics approach to organic-rich shale characterization (20 minutes) - Adam M. Allan, Stanford University, USA*

14D 20 August 2014, 9:40-11:25

Location: Sycamore suite (ground floor)

Moderator: Dr. Mikhail Geilikman, Shell International Exploration and Production Inc., USA

- *Permian Zechstein Kupferschiefer Black Shale in Germany – Drilling a Resource for Metals associated with Hydrocarbons (40 minutes) - Volker Spieth, VS.GLOBALMETAL LLC, Consultancy and Project Management, USA*
- *Cracking conditions of oils existing in different modes of occurrence and forward and backward inference of gas source rock kitchen of oil cracked type (30 minutes) - Dr. Zhaoyun Wang, Research Institute of Petroleum Exploration & Development, China*
- *A New Phase Mixture Approach for the Gas-Liquid Flow in Shale Reservoir (20 minutes) - Yasser Safa, ZHAW Zurich University of Applied Sciences, Switzerland*

Session 15: ENERGY AND ECOSYSTEMS

Chaired by: Prof. William Lewis, University of Colorado, USA

15B 19 August 2014, 1:40 - 3:25

Location: Rowan suite (first floor)

Moderator: Prof. Michael Düren, University of Giessen, Germany

- *The future role of Microbial Fuel Cells (30 minutes) - Prof. John Greenman, University of the West of England, UK*
- *Short rotation coppice (SRC) plantations can enhance phytodiversity in agricultural landscapes (30 minutes) - Dr. Sarah Baum, Thünen Institute of Rural Studies, Germany*

PRESENTATIONS - BY TOPIC

15D 20 August 2014, 9:40-11:25

Location: Maple suite (first floor)

Moderator: Prof. John Greenman, University of the West of England, UK

- *DESERTEC and beyond (30 minutes) - Prof. Michael Düren, II. Phys. Inst., Univ. Giessen, Germany*
- *Influences of bioenergy crops on soil C dynamics in the mid-South USA (30 minutes) - Prof. Michael A. Blazier, Louisiana State University Agricultural Center, USA*
- *Assessment of the effect of invasive species on the structure and function of the Sylt-Rømø Bight ecosystem, northern Wadden Sea, Germany (30 minutes) - Prof. Dan Baird, Stellenbosch University, South Africa*

Session 16: GREENHOUSE GAS CONTROL TECHNOLOGIES

16B 19th August 2014, 1:40-3:25

Location: Oak suite (first floor)

Moderator: Prof. Emmanuel Witrant, UJF-Grenoble 1/CNRS, France

- *Combined Heat and Power (CHP) as a Possible Method for Reduction of the CO₂ Footprint of Greenhouse Horticulture (30 minutes) - Peter Vermeulen, Greenhouse Technology, The Netherlands*
- *Alternative sources of CO₂ for the greenhouse horticulture (20 minutes) - Peter Vermeulen, Greenhouse Technology, The Netherlands*
- *Assessment of Greenhouse Gas Control Technology Options within the Energy, Water and Food Nexus (20 minutes) - Tareq Al-Ansari, Imperial College, UK*
- *Calculation of CO₂ freezing points in mixtures using SRK and PR EOSs (20 minutes) - Giorgia De Guido, Politecnico di Milano, Italy*

16G 21st August 2014, 1:40-3:25

Location: Pine suite (first floor)

Moderator: Peter Vermeulen, Greenhouse Technology, The Netherlands

- *Modeling greenhouse gas atmospheric history from firn air measurements (30 minutes) - Prof. Emmanuel Witrant, UJF-Grenoble 1/CNRS, France*
- *Environmental and Cost Performances of Smart Grids in North West Europe (30 minutes) - Dr. Hossein Azadi, Hasselt University, Belgium*
- *Greenhouse Gas Alleviation by Compost Control Method (30 minutes) - Mrs. SIBOSIKO Consolée, University of Rwanda, Rwanda*

Session 18: GRID RELIABILITY AND POWER TRANSMISSION TECHNOLOGY

Chaired by: Dr. Sasa Djokic, University of Edinburgh, UK

18A 19th August 2014, 10:35-12:20

Location: Maple suite (first floor)

Moderator: Dr. Jayant Kumar, Alstom Grid Inc, USA

- *Assessment of Reliability Performance of Future “Smart Grids” (30 minutes) - Dr. Sasa Djokic, University of Edinburgh, UK*
- *Smart grid planning for DSO’s (20 minutes) - Mr. Ivan Weber, University of Applied Sciences and Arts Dortmund, Germany*
- *SADC Power Grid Reliability - A Steady-state Contingency Analysis and Strategic HVDC Interconnections Using the N-1 Criterion (20 minutes) - Stacey Mwale, University of Kwazulu-Natal, South Africa*

18B 19 August 2014, 1:40-3:25

Location: Maple suite (first floor)

Moderator: Dr. Sasa Djokic, University of Edinburgh, UK

- *Diagnostic intelligence in high voltage equipment for future grid reliability (30 minutes) - Prof.dr. Johan J. Smit, Delft University of Technology, The Netherlands*
- *Power Flow Control and Grid Support in Grid-Connected Converters Based on Symmetrical Components (30 minutes) - Dr. Malgorzata Bobrowska-Rafal, Warsaw University of Technology, Poland*
- *Approaching the Fault Passage Indicator (20 minutes) - Carlos Gonzalez-de Miguel, University of Leuven, Belgium*

18F 21st August 2014, 10:35-12:20

Location: Ash suite (first floor)

Moderator: Prof.dr. Johan J. Smit, Delft University of Technology, Netherlands

- *Advanced Methods in Transmission Topology Control Optimization and their Applications (30 minutes) - Dr. Alex Rudkevich, Newton Energy Group, LLC, USA*
- *Wireless power transmission technology for contactless recharging and batteryless supply (30 minutes) - Dr. Mauro D’Arco, University of Naples Federico II, Italy*
- *On the Topology of the Reserve Grid regarding Reliability and Cost (20 minutes) - Raffael La Fauci, Electric Utility of the City of Zurich, Switzerland*
- *Generating electricity during peak hours in Asuncion, Paraguay, through anaerobic digestion of cultivated water hyacinths (20 minutes) - Felipe Mitjans, Universidad Nacional de Asunción, Campus UNA, Paraguay*

PRESENTATIONS - BY TOPIC

Session 19: INTEGRATING RENEWABLE ENERGY TO THE GRID

Chaired by: Prof. Innocent Davidson, University of Kwazulu-Natal, Westville Campus, South Africa

19E 21st August 2014, 8:30-10:15

Location: Cedar suite B (ground floor)

Moderator: Prof. Herminio Martinez-Garcia, Technical University of Catalonia - BarcelonaTech, Spain

- *Power Deficits and Outage Planning in South Africa (30 minutes) - Prof. Innocent Davidson, University of Kwazulu-Natal, Westville Campus, South Africa*
- *Are the Power Evacuation overdesigned for Wind farms? (30 minutes) - Atul Shah, Atmay Advisors, India*
- *Decision Metrix: A New Approach to Voltage Quality Monitoring on the Irish Distribution Grid (30 minutes) - Alan O'Kelly, Premium Power Ltd, Ireland*

19F 21st August 2014, 10:35-12:20

Location: Elm suite (first floor)

Moderator: Prof. Innocent Davidson, University of Kwazulu-Natal, South Africa

- *The Use of Power DC-DC Converters and Gyrator Structures for Energy Processing in Photovoltaic Solar Facilities (30 minutes) - Prof. Herminio Martinez-Garcia, Technical University of Catalonia - BarcelonaTech (UPC), Spain*
- *Predicting Harmonic Distortion Level of a Voltage Source Converter at the PCC of a Grid (20 minutes) - Preye M. Ivry, University of Nottingham, UK*
- *Frequency regulation by photovoltaic generators (20 minutes) - Emil Dvorsky, University of West Bohemia, Czech Republic*
- *Offering model for a virtual power plant considering uncertainties (20 minutes) - Shuang Yu, Hohai University, China*

19G 21st August 2014, 1:40 - 3:25

Location: Ash suite (first floor)

Moderator: Atul Shah, Energy & General Management Advisors, India

- *Grid Integration of Renewables – Challenges & Technology Adoption (30 minutes) - Dr. Jayant Kumar, Alstom Grid Inc, USA*
- *Facilitating renewable energy integration with smart grid technology based voltage control scheme (30 minutes) - Pengfei Wang, Newcastle University, UK*
- *Geographically Optimised Portfolios of Renewable Power Plants (30 minutes) - Antriksh Singh, Laboratory for Energy Conversion, IET, ETH Zürich, Switzerland*

Session 21: ENHANCED OIL RECOVERY

Chaired by: Dr. Christian Bittner, BASF - The Chemical Company, Germany

21C 19 August 2014, 3:45-5:30

Location: Pine suite (first floor)

Moderator: Prof. Laura Romero-Zerón, University of New Brunswick, Canada

- *Chemical Enhanced Oil Recovery (CEOR) as Technology for Future Oil Production (40 minutes)* - Dr. Christian Bittner, BASF - The Chemical Company, Germany
- *Colloidal Dispersion Gels (CDG) to Improve Volumetric Sweep Efficiency in Waterflooding Processes (20 minutes)* - Eduardo Manrique, PhD, Tiorco LLC, USA
- *An assessment of fracture containment due to variations in underground rock characteristics (20 minutes)* - Dr Kenneth Eshiet, University of Leeds, UK

21G 21st August 2014, 1:40-3:25

Location: Elm suite (first floor)

Moderator: Dr. Christian Bittner, BASF, Germany

- *Self-Assembling Polymeric Systems for Enhanced Heavy Oil Recovery (30 minutes)* - Prof. Laura Romero-Zerón, Ph. D., P. Eng., SPEC., University of New Brunswick, Fredericton-Campus, Canada
- *Successful Polymer Gels Application in a Highly Channeled Peripheral Injection Well: Tello Field Pilot (30 minutes)* - Eduardo Manrique, PhD, Tiorco LLC, USA
- *Geochemical Modeling of water flooding oil in calcite reservoirs at high carbon dioxide pressure (40 minutes)* - Prof. Dr. Hans Bruining, University of Technology, Delft, The Netherlands

Session 22: RENEWABLE ENERGY

22D 20 August 2014, 9:40-11:25

Location: Ash suite (first floor)

Moderator: Vatsal Bhatt, Brookhaven National Laboratory, USA

- *Consumer's perception of on-shore wind energy: The case of Apulia Region in Southern Italy (30 minutes)* - Dr. Caterina De Lucia, University of Foggia, Italy
- *Scaling up Renewable Energy Exports to Address Regional Energy Poverty: Financing Techniques, Regulatory Measures and the Role of a Specialist Organisation (30 minutes)* - Steven Geroe, University of Melbourne, Australia

ORGANISERS

THANK YOU

To all the organisers of the Second *International Symposium on Energy Challenges and Mechanics*, we thank you. It is only through your dedication, commitment and tireless work that this conference could be a success.

SCIENTIFIC COMMITTEES

Oil and Gas

Sjoerd Brouwer, Shell
Michael Celia, Princeton University, USA
Joseph Emans, Transfield Worley Ltd, New Zealand
Haiying Huang, Georgia Institute of Technology, USA
Makky S. Jaya, GFZ German Research Centre for Geosciences, Germany
Liming Li, SINTEF Petroleum Research, Norway
Yinghui Liu, Shell
Choo Yoo Sang, National University of Singapore, Singapore
Filippo Segatori, Technip
Lifeng Wang, BP, UK
Zonggang Wang, SINOPEC, China
Jon Zhang, Hess Corporation, USA
Pinggang Zhang, BP, UK

Unconventional Hydrocarbon Resources

John Chen, University of Calgary, Canada
Weiming Li, Schlumberger, USA
Hamed Soroush, Shell
HengAn Wu, University of Science & Technology of China
Mohamed Rouainia, Newcastle University, United Kingdom

Fires/Corrosion/Integrity/Safety/Risk

Andrew Duncan, HSE Energy Division - Offshore, UK

Reza Javaherdasht, ParsCorrosion Consultants, Australia
Enrique Munoz-Garcia, MMI Engineering, UK
Yong Wang, University of Manchester, UK
Valerie Wilson, Kosmos Energy, USA
Honghui Yu, The City College of New York - CUNY, USA

Energy Storage and Conversion

Craig B. Arnold, Princeton University, USA
W. Craig Carter, Massachusetts Institute of Technology, USA
Hanqing Jiang, Arizona State University, USA
Yiguang Ju, Princeton University, USA
Jiangyu Li, University of Washington, USA
Teng Li, University of Maryland, USA
Petr Novak, Paul Scherrer Institute, Switzerland
Pradeep Sharma, University of Houston, USA
Zhigang Suo, Harvard University, USA
Kaiyang Zeng, National University of Singapore, Singapore
Sulin Zhang, Pennsylvania State University, USA
Ting Zhu, Georgia Institute of Technology, USA

Piezoelectric Energy Harvesting

Sondipon Adhikari, Swansea University, UK
Long-Qing Chen, Pennsylvania State University, USA
Daining Fang, Peking University, China
John E. Huber, University of Oxford, UK
S. Gopalakrishnan, Indian Institute of Science, India
Liyang Jiang, University of Western Ontario, Canada
Qingping Sun, Hong Kong University of Science & Technology, China

Nuclear Energy

Haofeng Chen, University of Strathclyde, UK
Shuisheng He, Sheffield University, UK
Lanru Jing, Royal Institute of Technology (KTH), Sweden
Hongbing Lu, University of Texas at Dallas, USA
Nawal K Prinja, AMEC Clean Energy Europe, UK
Jiyuan Tu, RMIT University, Australia
Jianlong Wang, Tsinghua University, China
Shengke Zhi, AMEC, UK

SCIENTIFIC COMMITTEES

Hydrogen / Fuel Cells

Rafi Blumenfeld, Imperial College London, UK
Mingwei Chen, Tohoku University, Japan
Wei-Hsin Chen, National Cheng Kung University, Taiwan
Shengmin Guo, Louisiana State University, USA

Wind Energy

Erik Lundtang Petersen, Technical University of Denmark, Denmark
Mohamed Pourkashanian, University of Leeds, UK
Fotis Sotiropoulos, University of Minnesota
Tongguang Wang, Nanjing University of Aeronautics and Astronautics, China

Nano-Energy

Jr-Hau He, National Taiwan University, Taiwan
Bin Liu, Tsinghua University, China
Caofeng Pan, Chinese Academy of Sciences
Yong Qin, Lanzhou University, China
Zhong Lin Wang, Georgia Institute of Technology, USA
Quanshui Zheng, Tsinghua University, China

Solar Cells

Judith Driscoll, University of Cambridge, UK
Harley T. Johnson, University of Illinois at Urbana-Champaign, USA
Massimiliano Vasile, University of Strathclyde, UK
John I B Wilson, Heriot-Watt University, UK

Energy and Environment

S.K. Chou, Energy Studies Institute, National University of Singapore, Singapore
Daniel M. Kammen, University of California, Berkeley, USA
Henrik Lund, Aalborg University, Denmark
Abdul-Ghani Olabi, University of the West of Scotland, UK
Li Shao, University of Reading, UK
Philip Hall, The University of Western Australia, Australia

Carbon Capture

Wojciech Budzianowski, Wrocław University of Technology, Poland

Xi Chen, Columbia University, USA

Wave Energy

Torgeir Moan, Norwegian University of Science and Technology, Norway

Philip Hall, The University of Western Australia, Australia

Thermal Power

Gilberto Francisco Martha de Souza, University of São Paulo, Brazil

Mechanics of Materials and Structures

Laura De Lorenzis, Technische Universität Braunschweig, Germany

Yonggang Huang, Northwestern University, USA

Shuguang Li, University of Nottingham, UK

Shaoxing Qu, Zhejiang University, China

Zheng Zhong, Tongji University, China

Energy efficiency

David Reay, Newcastle University and David Reay & Associates, UK

Energy and superconductivity

Quan Li, University of Aberdeen, UK



Hosted by:

North Sea
Conference & Journal

North Sea Conference & Journal LTD

Aberdeen, Scotland, UK

<http://www.pluslearning.co.uk/ecm2>

Email: ask@pluslearning.co.uk

Tel: +44 (0) 1224 875635

