

## YOUR SESSION & LOCATION:

## **COVER PAGE PHOTO CONTEST**

The winning image for ISECM's 2014 Cover Page Contest is featured on our conference booklet. Criteria for entries included: Relation to a speaker's research, aesthetics suitable for cover design, and sufficient image quality/size. Congratulations, Mitch!

Non-Innocent Flow Battery by Mitch Anstey "The molecules are representative of our flow battery electrolytes that demonstrate redox non-innocent behavior in their redox events, and they are overlaid on a graphical depiction of a flow battery. The background in one picture is a solar photovoltaic farm that is our target application."

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## **WELCOME!** A Letter from the Chairs

8 July, 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 policymaking.

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 quality speakers representing 40 countries from around the world.

Welcome To ISECM 2014!

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

Dr. Quan Li Co-Chair, ISECM Conference University of Aberdeen, UK

# **NEED TO KNOW** General Notes to the Delegates

# **KEEP YOUR NAME BADGE!**

Delegates **must** wear their lanyard name 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-transferrable. Persons who cannot provide a badge or use the badge of another participant will be asked to leave immediately.

# **SESSION ETIQUETTE**

Speakers: Please limit presentation & discussion to your allocated time.

Moderators: Please arrive at your session 5-10 minutes early.

**Audience:** There are no photos permitted during presentations. Taking pictures of a speaker's slides without explicit consent is both unethical and inappropriate, as well as distracting to the presentation. We thank you for your cooperation.

# **NO SMOKING PLEASE**

Our conference venue is 100% non-smoking. Please smoke outside, away from entrances.



# **TRANSPORT IN ABERDEEN**

### **BY BUS**

First Bus 5 stops in front of the Hilton Treetops hotel 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

# SCHEDULE OVERVIEW

<b>DAY 1</b> TUE, 8 JULY 2014	DAY 2 WED, 9 JULY 2014	<b>DAY 3</b> THUR, 10 JULY 2014
<b>REGISTRATION</b> 8:00 - 9:10 Beechwood Suite	<b>PRINCIPAL LECTURES</b> 8:30 - 9:20 Sycamore Suite	
<b>OPENING REMARKS</b> 9.10 - 9.25	Beechwood Suite Cedar Suite	<b>PARALLEL E</b> 8:30 - 10:15
9:25 - 10:15 Cedar Suite	<b>COFFEE BREAK</b> 20 minutes	
<b>COFFEE BREAK</b> 20 minutes	PARALLEL D	<b>COFFEE BREAK</b> 20 minutes
<b>PARALLEL A</b> 10:35 - 12:20	9:40 - 11:25	<b>PARALLEL F</b> 10:35 - 12:20
LUNCH 80 minutes	<b>LUNCH</b> 65 minutes	LUNCH 80 minutes
<b>PARALLEL B</b> 13:40- 15:25		<b>PARALLEL G</b> 13:40 -15:25
PARALLEL B 13:40-15:25 COFFEE BREAK 20 minutes	<b>Social Programme</b>	PARALLEL G 13:40 -15:25 COFFEE BREAK 20 minutes
PARALLEL B 13:40-15:25 COFFEE BREAK 20 minutes PARALLEL C 15:45 - 17:30	SOCIAL PROGRAMME 12:30 - 18:30 <i>Tours</i> 19:00 - 22:30 Conference dinner	PARALLEL G 13:40 -15:25 COFFEE BREAK 20 minutes CLOSING LECTURE 15:45 - 16:35

## **SCHEDULE NOTES**

## Opening

Welcome! The ISECM opening remarks will be given by Dr. Henry Tan in the Cedar Suite at 9:10 am. Prof Zhangxing (John) Chen's opening lecture to follow. See page 9 for details.

## Lunch

Each day, a lunch buffet will be provided for all ISECM delegates in the Catering Areas. Lunch tickets will tell you which station to use - keep this ticket for all three days. Find a seat in the Reception Foyer, Sycamore Lounge, Springfield's Restaurant or Bar and enjoy your meal. Lunch is not included for accompanying persons.

## Reception

Come relax and network at a welcome reception on the close of Day 1. Light refreshments, tea and coffee will be provided alongside a cash bar for additional beverages. All delegates are welcome to attend, including accompanying persons and students (*The official ISECM 2014 Group photo will be taken at 6:30p for all who wish to join*).

## **Principal Lectures**

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

## Social Programme

Tours will depart from the car park at 12:30pm on Day 2. Coaches will take you from the tour straight to dinner (See page 6 for details). Students do not attend the social programme.

## Closing

Prof. George Crabtree will give the closing lecture on Day 3 at 3:45 pm in the Cedar Suite (see page 9 for details). Closing remarks by Dr. Henry Tan to follow.

# SOCIAL PROGRAMME

# MEET

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

## **CASTLE TOUR**

#### 12:30p, 9 June 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.

\*Delagates will take part in a guided tour of the castle and may explore the grounds. Participants should dress for all weather.

## **CONFERENCE DINNER**



Image ©Colin Smith and licensed for reuse under Creative Commons Licence

#### 7:00p, 9 June 2014

#### Mercure Aberdeen Ardoe House Hotel

Mercure Aberdeen Ardoe House Hotel is a 19th century mansion house set in 30 acres of tranquil countryside. This 4 Star hotel's award winning chefs conjure up one winning dish after another, using fresh, local produce and the finest international ingredients.

\*After Dinner Speech, titled "Innovation is the key to competitiveness", given by Steve Wayman, CEO of Wood Group Kenny.

# **DROP OFF**

On the return trip, coaches will make two stops. Delegates can be dropped off in Aberdeen city centre or returned to the conference venue.

## **CONFERENCE MAP**

Ground floor



## **CONFERENCE MAP** First

First floor

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



## **OPENING LECTURE**

R&D Programs in Unconventional Oil and Gas Reservoir Development & Production

Time: 8th July 2014, 9:20 - 10:10

Location: Cedar suite

### Professor Zhangxing (John) Chen

Department of Chemical and Petroleum Engineering, Xi'an Jiaotong University, China

Director, Schlumberger iCentre for Simulation & Visualization

Director, Foundation CMG/Frank-Sarah Meyer Collaboration Centre, University of Calgary, Canada

As conventional oil and gas reserves dwindle and oil prices rise, the recovery of unconventional oil and gas (such as heavy oil, oil sands, tight oil/gas, and shale oil/gas) is now the center stage. In particular, the shale gas play development and production will hold a significant role in the recovery of unconventional resources. This presentation will be focused on an integrated solution program in shale gas play development and production.

Moderator: Dr Henry Tan, University of Aberdeen, UK

## **CLOSING LECTURE**

Time: 10 July 2014, 15:45 - 16:35 Location: Cedar suite



#### JCESR: A New Paradigm for Battery Research

#### Professor George W. Crabtree

Director, Joint Center for Energy Storage Research, Argonne National Laboratory

Senior Scientist, Distinguished Fellow and Associate Division Director, Materials Science Division, Argonne National Laboratory

Professor of Physics, Electrical Engineering and Mechanical Engineering, University of Illinois at Chicago, USA

Member of the U.S. National Academy of Sciences

An introduction to JCESR's vision and organization will be followed by an outline of three grand science and technology challenges for next generation batteries: metal anodes, solvation/desolvation phenomena, and solid electrolyte interphases. An update on progress in JCESR's first 18 months of operation will be given, featuring highlights from discovery science, battery design, research prototyping and manufacturing collaboration.

Moderator: Dr Henry Tan, University of Aberdeen, UK

## PRINCIPAL LECTURES Time: 9th July 2014, 8:30 - 9:20

#### Location: Sycamore suite



Advanced Computation Models for the Evolution of Fracture Networks in Shale During Hydraulic Fracturing

#### Dr. Tarabay Antoun

Atmospheric, Earth and Energy Division Leader (Acting) Physical and Life Sciences Directorate Lawrence Livermore National Laboratory, USA

Moderator: Dr. Erkan Oterkus, University of Strathclyde, UK

#### Location: Beechwood suite



Promise & Challenges of Direct Alcohol Fuel Cells

#### Professor Tianshou (Tim) Zhao

Chair Professor of Mechanical & Aerspace Engineering, Hong Kong University of Science & Technology (HKUST)

Director, The HKUST Energy Institute

Moderator: Prof. Steven Chuang, University of Akron, USA



Location: Cedar suite

Alternative Fuels: Challenges & Opportunities of Combustion Research

Professor Yiguang Ju Department of Mechanical and Aerospace Engineering, Princeton University, USA

Moderator: Prof. Suk Ho Chung, KAUST, Saudi Arabia

## PARALLEL SESSION TIMETABLES

## PARALLEL A 8 July 2014, Tuesday, 10:35-12:20

Session Slot	Room
03a	Sycamore suite (ground floor)
04a	Cedar suite A (ground floor)
05a	Cedar suite B (ground floor)
10a	Rowan suite (first floor)
15a	Pine suite (first floor)
17a	Maple suite (first floor)
21a	Ash suite (first floor)
23a	Beechwood suite (ground floor)
24a	Oak suite (first floor)
25a	Elm suite (first floor)

## PARALLEL B 8 July 2014, Tuesday, 13:40-15:25

Session Slot	Room
01a	Oak suite (first floor)
02a	Pine suite (first floor)
03b	Sycamore suite (ground floor)
04b	Cedar suite A (ground floor)
05b	Cedar suite B (ground floor)
06a	Rowan suite (first floor)
07a	Maple suite (first floor)
21b	Ash suite (first floor)
23b	Beechwood suite (ground floor)
24b	Elm suite (first floor)

# PARALLEL SESSION TIMETABLES

## PARALLEL C 8 July 2014, Tuesday, 15:45-17:30

Session Slot	Room
03c	Sycamore suite (ground floor)
06b	Cedar suite (ground floor)
08a	Elm suite (first floor)
09a	Rowan suite (first floor)
12a	Pine suite (first floor)
21c	Ash suite (first floor)
23c	Beechwood suite (ground floor)
25b	Maple suite (first floor)
27a	Oak suite (first floor)

## PARALLEL D 9 July 2014, Wednesday, 9:40-11:25

Session Slot	Room
01b	Elm suite (first floor)
02b	Oak suite (first floor)
03d	Sycamore suite (ground floor)
06c	Cedar suite (ground floor)
09b	Pine suite (first floor)
14a	Maple suite (first floor)
15b	Rowan suite (first floor)
17b	Ash suite (first floor)
23d	Beechwood suite (ground floor)

## PARALLEL E 10 July 2014, Thursday, 8:30-10:15

Session Slot	Room
04c	Rowan suite (first floor)
05c	Cedar suite B (ground floor)
06d	Cedar suite A (ground floor)
07b	Ash suite (first floor)
10b	Sycamore suite (ground floor)
13a	Oak suite (first floor)
14b	Maple suite (first floor)
15c	Pine suite (first floor)
23e	Beechwood suite (ground floor)
25c	Elm suite (first floor)

## PARALLEL F 10 July 2014, Thursday, 10:35 - 12:20

Session Slot	Room
02c	Oak suite (first floor)
04d	Cedar suite B (ground floor)
05d	Cedar suite A (ground floor)
06e	Sycamore suite (ground floor)
10c	Pine suite (first floor)
13b	Maple suite (first floor)
14c	Ash suite (first floor)
15d	Rowan suite (first floor)
17c	Elm suite (first floor)
23f	Beechwood suite (ground floor)

# PARALLEL SESSION TIMETABLES

## PARALLEL G 10 July 2014, Thursday, 13:40-15:25

Session Slot	Room
05e	Cedar suite B (ground floor)
07c	Oak suite (first floor)
08b	Ash suite (first floor)
09c	Maple suite (first floor)
10d	Rowan suite (first floor)
12b	Pine suite (first floor)
13c	Sycamore suite (ground floor)
23g	Beechwood suite (ground floor)
27b	Elm suite (first floor)

### Session 01: Reservoir Stimulation & Production

Chaired by: Prof. Haiying Huang, Georgia Institute of Technology, USA Dr. Weiming Li, Schlumberger, USA

## **1** 8 July 2014, 13:40-15:25

**UIA** Location: Oak suite (first floor) Moderator: Dr. Weiming Li, Schlumberger, USA

- Drilling Mud Loss in a Natural Fracture A PKN Fracture Geometry Model Based Analysis (20 minutes) - Prof. Haiying Huang, Georgia Institute of Technology, USA
- Fracture Network Engineering for Hydraulic Fracturing (20 minutes) Dr. Branko Damjanac, Itasca Consulting Group Inc., USA
- Coupled hydromechanical modelling of mudstone compaction (20 minutes) - Dr. Mohamed Rouainia, Newcastle University, UK
- Dynamic characteristics of crack extension and controlling during the processing of hydraulic fracturing in coal containing gas (20 minutes) Prof. Quangui Li, State key laboratory of Coal Resources and Mine Safety, China; China University of Mining and Technology, China
- The Creation of Synthetic Clay Content Logs with a Neural Network & their Implications for the Hydraulic & Mechanical Properties of Crystalline Rock (20 minutes) - Carola Meller, Karlsruhe Institute of Technology, Germany

#### **01B** 9 July 2014, 9:40-11:25 Location: Elm suite (first floor)

Moderator: Prof. Haiying Huang, Georgia Institute of Technology, USA

- Stress orientations found in north-east Germany differ from the West European trend (30 minutes) - Prof. Dr. Frank Roth, GFZ German Research Centre for Geosciences, Germany
- Candidate Well Screening for Refracturing in the Eagle Ford Shale (20 minutes) Dr. Weiming Li, PetroTechnical Services, USA
- Modelling Complex Hydraulic Fracturing in Naturally Fractured Formations and Integration to Production Optimization Workflow (30 minutes) -Dr. Olga Kresse, Pressure Pumping and Chemistry Product Group, USA
- Optimizing Fracture Spacing of Horizontal Well Fracturing in Shale (20 minutes) Prof. HengAn Wu, University of Science and Technology of China

### Session 02: LITHIUM ION BATTERIES

Chaired by:

Prof. Yue Qi, Michigan State University, USA Prof. Kaiyang Zeng, National University of Singapore, Singapore

#### **O2A** 8 July 2014, 13:40-15:25 Location: Pine suite (first floor)

Moderator: Prof. Mahendra Sunkara, University of Louisville, USA

- A Path-Independent Integral for Fracture of Solids under Combined Electrochemical and Mechanical Loadings (40 minutes) - Prof. Jianmin Qu, Northwestern University, USA
- SnS2@reduced graphene oxide nanocomposites as anode materials with high capacity for rechargeable lithium ion batteries (20 minutes) Prof. Huaqiang Cao, Tsinghua University, China
- Scalable approach for Si-based porous materials for lithium-ion battery applications (20 minutes) Prof. Soojin Park, UNIST, Korea
- *Ionic vs electronic power limitations in composite electrodes and multiscale analysis of their electrical properties* (20 minutes) Nicolas Besnard, Université de Nantes, CNRS, France; Renault, Technocentre de Guyancourt, France

## **N2R** 9 July 2014, 9:40-11:25

**UZD** Location: Oak suite (first floor) Moderator: Prof. Kaiyang Zeng, National University of Singapore

- Predicting Interfaces Properties in Li-Ion Batteries (40 minutes) Prof. Yue Qi, Michigan State University, USA
- Nanowire Based Materials for High Energy Density Li-ion Batteries (30 minutes) Prof. Mahendra Sunkara, University of Louisville, USA
- Deformation and Electrical Characterizations of Individual Li-rich Layered Particles for Cathode Materials Using Scanning Probe Microscopy (30 minutes) - Prof. Kaiyang Zeng, National University of Singapore

#### **02C** 10 July 2014, 10:35-12:20 Location: Oak suite (first floor)

Moderator: Prof. Yue Qi, Michigan State University, USA

- Energy efficiency of Li-alloy electrodes during cyclic charge-discharge (30 minutes) Prof. Min Zhou, Georgia Institute of Technology, USA
- Fe3O4 Nanoparticles/2D Nanosheet Composites for Li Ion Battery Anodes (30 minutes) Prof. Junmin Xue, National University of Singapore

- Smart Design for Electrodes and Binders in Silicon Anodes of Lithium Rechargeable Batteries (20 minutes) - Prof. Jang Wook Choi, Korea Advanced Institute of Science and Engineering
- Electronic Structure Modelling of Reactions at Electrode/Electrolyte Interfaces in Lithium Ion Batteries (20 minutes) - Dr. Kevin Leung, Sandia National Laboratories, USA

#### Session 03: ENERGY STORAGE

Chaired by:

Prof. George W. Crabtree, Argonne National Laboratory; University of Illinois at Chicago, USA

**O3A** 8 July 2014, 10:35-12:20 Location: Sycamore suite (ground floor) Moderator: Prof. Robert McMeeking, University of California Santa Barbara, USA; University of Aberdeen, UK

- Modeling mechanical degradation in thin film electrodes for high energy density lithium batteries (40 minutes) Prof. Huajian Gao, Brown University, USA
- An electroneutral computational homogenization formulation for Li-ion battery cells (20 minutes) Prof. Alberto Salvadori, Eindhoven University of Technology, The Netherlands
- Isogeometric Analysis of intercalation-induced stresses and surface mechanical effects in Li-ion battery electrode particles (20 minutes) Dr. Peter Stein, Technische Universitaet Darmstadt, Germany
- Evaluating the Capacity Fade of Li-ion Batteries Using a Double Dynamic Stress Accelerated Degradation Test (20 minutes) - Prof. Kuan-Jung Chung, National Changhua University of Education, Taiwan

**03B** 8 July 2014, 13:40-15:25 Location: Sycamore suite (ground floor) Moderator: Prof. Huajian Gao, Brown University, USA

- Development of stresses in silicon nanolayer under lithiation (30 minutes) -Prof. Aleksey D. Drozdov, Danish Technological Institute, Denmark; Aalborg University, Denmark
- Phase-field model for the interplay of diffusion and stresses in cathodic particles of lithium ion batteries (20 minutes) - Magalie Huttin, Karlsruhe Institute of Technology, Germany
- Atomic to nanoscale probing of structural and electrochemical evolution of energy storage materials under dynamic operating condition (30 minutes) - Dr. Chongmin Wang, Pacific Northwest National Laboratory, USA

• How Morphology Influences Conductivity in Li2O2 (20 minutes) - Dr. Wen-Tong Geng, GREEN, National Institute for Materials Science, Japan; University of Science and Technology Beijing, China

## **NRC** 8 July 2014, 15:45-17:30

**IJU** Location: Sycamore suite (ground floor)

Moderator: Prof. Aleksey Drozdov, Danish Technological Institute; Aalborg University, Denmark

- The generation of stress in the storage particles of lithium-ion batteries (40 minutes) - Prof. Robert McMeeking, University of California, USA; University of Aberdeen, United Kingdom
- Structural control of metal oxide nanomaterials for Li-ion batteries (30 minutes) -Prof. Limin Qi, Peking University, China
- Aqueous Li-air rechargeable battery with protected lithium electrode (30 minutes) - Prof. Nobuyuki Imanishi, Mie University, Japan

## **NRN** 9 July 2014, 9:40-11:25

**UJD** Location: Sycamore suite (ground floor) Moderator: Prof. Nobuyuki Imanishi, Mie University, Japan

- Redox Non-Innocence: Enhancing the Stability and Performance of Flow Battery Electrolytes (20 minutes) - Dr. Mitchell R. Anstey, Sandia National Laboratories, USA
- Soft and Hard Templated Functional Ordered Mesoporous Materials for High Performance Li-ion Batteries (20 minutes) - Prof. Jinwoo Lee, Pohang University of Science and Technology (POSTECH), Korea
- Ionic Conducting Polymers Bearing Fluoroalkylsulfonylimide Groups and Their Applications in Energy Storage and Energy Saving Devices (20 minutes) -Dr. L. Luke Xue, Ningbo Institute of Material Technology and Engineering, China
- Advanced research on complex hydrides for electrochemical energy storage (20 minutes) Dr. Atsushi Unemoto, Tohoku University, Japan
- The True Role of Carbon Supported MnOx Catalysts on the Discharge and Charge of Li-O2 Batteries (20 minutes) Dr. Juan Herranz, Technische Universität München, Germany

### Session 04: RESERVOIR SIMULATION

#### Chaired by:

Prof. Zhangxing (John) Chen, Xi'an Jiaotong University, China; University of Calgary, Canada

## **NAN** 8 July 2014, 10:35 - 12:20

**U4A** Location: Cedar suite A (ground floor) Moderator: Prof. Zhangxing (John) Chen, Xi'an Jiaotong University, China; University of Calgary, Canada

- One-way versus two-way coupling in reservoir-geomechanical models (40 minutes) - Prof. Jean H. Prévost, Princeton University, USA
- Impact of temperature on CO2 storage in a saline aquifer based on fluid flow simulations and seismic data (20 minutes) - Dr. Alexandra Ivanova, Helmholtz Centre Potsdam; GFZ German Research Centre for Geosciences, Germany
- A comparison of water chemistry to a TOUGHREACT model for a CO2-enhanced oil recovery project in a carbonate reservoir (20 minutes) Maurice Shevalier, University of Calgary, Canada
- A new model to predict the unsteady production of fractured horizontal wells with variable width and application in low permeability oil reservoirs (20 minutes) Fan-hui Zeng, Southwest Petroleum University, China

#### **04B** 8 July 2014, 13:40 - 15:25 Location: Cedar suite A (ground floor) Moderator: Prof. Jean H. Prévost, Princeton University, USA

- Study on the Elastic Production Mechanism in Fractured-Vuggy Carbonate Reservoir of Single Fracture and Single Cave with Bottom Water (30 minutes) -Dr. Liuren Li, Xi'an Shiyou University, China
- Reducing Water Production in Edge-Water Drive Fields with Induced Formation Damage (20 minutes) Dr. Abbas Zeinijahromi, The University of Adelaide, Australia
- Modelling of reservoirs in management and control frameworks (20 minutes) Dr. José Pinho, University of Minho, Portugal

## **10** July 2014, 8:30 - 10:15

**U4U** Location: Rowan suite (first floor) Moderator: Prof. Michael J King, Texas A&M University, USA

- Implementation of new retention model for the simulation of polymer flood in heterogeneous reservoirs (30 minutes) Prof. Kun Sang Lee, Hanyang University, Korea
- TOUGH2/EOS7Rn as a reliable numerical modelling tool for the exploration of fractured groundwater and geothermal reservoirs (20 minutes) Dr. Zakaria SAADI, Institute of Radiological Protection and Nuclear Safety, France
- Application of finite element method to well testing technology (20 minutes) Dr. Jingjing Guo, Southwest Petroleum University, China
- Simulation of multi-stage hydro-fracture development by the SIE method (20 minutes) Grigory Paderin, Moscow Institute of Physics and Technology, Russia

#### **04D** 10 July 2014, 10:35 - 12:20 Location: Cedar suite B (ground floor)

**U4D** Location: Cedar suite B (ground floor) Moderator: Prof. Kun Sang Lee, Hanyang University, Korea

- Applications of a Novel w(t) Pressure Depletion Analysis to the Optimization of Unconventional Reservoirs (30 minutes) - Prof. Michael J King, Texas A&M University, USA
- Surrogate based waterflooding Optimization (20 minutes) Dr. Bernardo Horowitz, Federal University of Pernambuco, Brazil
- Parameterization requirements for the underground land-use planning (20 minutes) Dr. Frank Dethlefsen, Christian-Albrechts University in Kiel, Germany
- How to Represent Fractures in Coupled Geomechanical Flow Simulations (20 minutes) Reza Sanaee, Robert Gordon University, UK

### Session 05: ENERGY AND ENVIRONMENT

Chaired by: Prof. Amit Kumar, University of Alberta, Canada Dr. Ed Rode, Det Norske Veritas Inc, USA Prof. Wei-Hsin Chen, National Cheng Kung University, Taiwan

## **೧Ნ**۸ 08 July 2014, 10:35 - 12:20

**UJA** Location: Cedar suite B (ground floor) Moderator: Prof. Wei-Hsin Chen, National Cheng Kung University, Taiwan

- Challenges and Progress for CO2 Conversion to Value Added Products (40 minutes) Dr. Ed Rode, DNV Research and Innovation; Det Norske Veritas Inc, USA
- Waste heat upgrading as a new strategy for reducing the energy penalty of CO2 capture (30 minutes) Prof. Mikhail Sorin, Université de Sherbrooke, Canada
- MOFs towards application: requirements for use within CO2 capture (30 minutes)
  Dr. Richard Blom, Sorbent technologies, SINTEF Materials & Chemistry, Norway

## **NFR** 08 July 2014, 13:40 - 15:25

**UJD** Location: Cedar suite B (ground floor) Moderator: Lowry Harper, President, Harper Consulting Company, USA

- Energy and environmental systems modeling for making better energy choices (30 minutes) Prof. Amit Kumar, University of Alberta, Canada
- No Policy, No Problem: Leveraging R&D in CO2 Storage into
- Economic Unconventional Applications (30 minutes) Dr. Peter McGrail, Pacific Northwest National Laboratory, USA
- Integration of agricultural and energy system models for biofuel assessment (20 minutes) Dr. Simla Tokgoz, International Food Policy Research Institute, Washington DC, USA
- Decision-making aid for the selection of renewable/sustainable energy systems for buildings (20 minutes) Laurie Brady, Liverpool John Moores University, UK

#### **05C** 10 July 2014, 8:30 - 10:15 Location: Cedar suite B (ground floor)

Moderator: Prof. Amit Kumar, University of Alberta, Canada

- Dinitrogen, Ammonia, and Methane Gas Production During the Anaerobic Processing of Animal Manure and Urine (30 minutes) - Lowry A. Harper, President, Harper Consulting Company, USA
- Development of detection and monitoring techniques of CO2 leakage from seafloor in sub-seabed CO2 storage (30 minutes) - Prof. Kiminori Shitashima, Kyushu University, Japan
- Defining ecological and economical hydropower operations: a framework for managing dam releases to meet multiple conflicting objectives (20 minutes) Dr. Elise R. Irwin, Auburn University, USA
- *River flow regime alterations induced by hydropower production* (20 minutes) **Prof. Gianluca Botter**, University of Padova, Italy

#### **10 July 2014, 10:35 - 12:20** Location: Cedar suite A (ground floor)

**UUD** Location: Cedar suite A (ground floor) Moderator: Dr. Ed Rode, Det Norske Veritas (USA) Inc

- Hydrogen and syngas production from the catalytic partial oxidation of methane with carbon dioxide addition (30 minutes) Prof. Wei-Hsin Chen, National Cheng Kung University, Taiwan
- Comparison of catalytic activity of nickel nanoparticles with other nanocatalysts for hydration of CO2 for carbon capture and storage via mineralization (30 minutes) Dr. Lidija Šiller, Newcastle University, UK
- Modelling Building Occupants' Energy Saving behaviour through Multi-Layer Network Simulation (20 minutes) - Dr. Bin Ren, City University of Hong Kong
- Biological treatment of effluents generated by amine based CO2-capture plants (20 minutes) - Ingrid Hauser, Norwegian University of Science and Technology, Norway

#### **05E** 10 July 2014, 13:40 - 15:25 Location: Cedar suite B (ground floor) Moderator: Dr. Lidija Šiller, Newcastle University, UK

- Alkaline ceramics as a possible option for the CO2 capture a high and moderate temperatures (20 minutes) Dr. Heriberto Pfeiffer, Universidad Nacional Autónoma de México, Mexico
- Continuous observation of subsurface gases by linear gas sensors (20 minutes) -Dr. Detlef Lazik, Helmholtz Centre for Environmental Research - UFZ, Germany
- High performance nanostructured hybrid ceramic membrane for carbon capture application (20 minutes) Ngozi C. Nwogu, The Robert Gordon University, UK
- Assessing the permeabity of a low permeable claystone (20 minutes) Prof. Richard Giot, Université de Lorraine, France

• Chemical Kinetic analysis of combustion for carbon capture from gas turbines using flue gas recycles (20 minutes) - Dr. Muhammad Akram, University of Sheffield, UK

#### Session 06: NANO-ENERGY

Chaired by: Prof. Yong Qin, Lanzhou University, China Prof. Jr-Hau He, National Taiwan University, Taiwan Prof. Yanglong Hou, Peking University, Peking University, China

### **NGA** 8 July 2014, 13:40 - 15:25

**UDA** Location: Rowan suite (first floor) Moderator: Prof. Krzysztof Winkler, University of Bialystok, Poland

- Graphene-based Nanocomposites for Lithium Batteries and Fuel Cells (40 minutes) Prof. Yanglong Hou, Peking University, China
- Smart Composites. The Synthesis, Characterization and Application of Well-Defined, Hierarchical Silicone/Carbon Architectures with Novel Physical Properties (30 minutes) - Dr. James P. Lewicki, Lawrence Livermore National Laboratory, USA
- Electrospinning and its application to lithium ion batteries (30 minutes) Prof. Jun-Seo Park, Hankyong National University, Korea

## **NGR** 8 July 2014, 15:45 - 17:30

**UOD** Location: Cedar suite A (ground floor)

Moderator: Prof. Helge Weman, Norwegian University of Science and Technology, Norway

- One dimensional ZnO nanomaterials and nanodevices for energy conversion (40 minutes) - Prof. Yue Zhang and Dr. Qingliang Liao, University of Science and Technology Beijing, China
- Nanoscale and bio-inspired cobalt oxide materials for artificial photosynthesis (20 minutes) Prof. Dr. Greta R. Patzke, University of Zurich, Switzerland
- ZnCo2O4 nanowire arrays grown on Ti foil as binder-free electrodes for highperformance Li-ion battery (20 minutes) - Prof. Zirong Tang, Huazhong University of Science and Technology, China
- A new approach for light energy harvesting based on photochromic electrets (20 minutes) Dr. Andrea Bianco, INAF Osservatorio Astronomico di Brera, Italy

## **NGC** 9 July 2014, 9:40 - 11:25

**UOU** Location: Cedar suite (ground floor)

Moderator: Prof. Haixia (Alice) Zhang, Peking University, China

 Towards low-cost, high-efficiency semiconductor nanowire/graphene solar cells (40 minutes) - Prof. Helge Weman, Norwegian University of Science and Technology, Norway

- Case Study in Use of Energy Harvesting to Power a combined Carbon Dioxide. • Temperature and Humidity Sensor for use in Building Control Applications (30 minutes) - Dr. Desmond Gibson, Chairman & CEO Gas Sensing Solutions Ltd. UK
- A General Route to fabricate multiple metal oxynitrides hollow spheres for efficient water splitting (20 minutes) - Prof. Liping Zhu, Zheijang University, China

### 10 July 2014, 8:30 - 10:15

Location: Cedar suite A (ground floor) Moderator: Dr. James P. Lewicki, Lawrence Livermore National Laboratory, USA

- High performance triboelectric generator with micro-nano dual structures (40 • minutes) - Prof. Haixia (Alice) Zhang, Peking University, China
- Capacitance performance of composites of carbon nanostructures and C60-Pd • polymer (30 minutes) - Prof. Krzysztof Winkler, University of Bialystok, Poland
- Laser sintering as a post-treatment for printed silver structures used as current • collectors in Organic Photovoltaïc devices (20 minutes) - Prof. dr. ir. Wim Deferme, Hasselt University, Belgium

### 10 July 2014, 10:35 - 12:20

Location: Sycamore suite (ground floor) Moderator: Prof. Zirong Tang, Huazhong University of Science and Technology, China

- High-performance fuel cells based on one-dimensional nanostructures (40 • minutes) - Prof. Jing Zhu & Prof. Jun Luo, Tsinghua University, China
- Water electrolysis and energy harvesting with OD Ion-Sensitive Field-Effect • Transistors (20 minutes) - Dr. Nicolas Clément, CNRS, France
- Sulphur Cross-linked Graphene Nano Platelets as Structural Composite • Supercapacitor Electrodes (20 minutes) - Dr. Richard Reece, University of Surrey, UK
- Hydrothermal synthesis NiCo2O4 nanowire with highly efficient electrochromic • performance (20 minutes) - Prof. Jiangping Tu, Zhejiang University, China

#### Session 07: DRILLING PROCESS AND TECHNOLOGY

Chaired by: Dr. Zonggang Wang, SINOPEC, China

## **7 A July 2014, 13:40 - 15:25** Location: Maple suite (first floor)

Moderator: Prof. HengAn Wu, University of Science and Technology of China

- Research and Application of Novel Jet Theories in Well Drilling and Completion (30 minutes) - Prof. Gensheng Li, China University of Petroleum, China
- Effect of a water based drilling waste on receiving soil properties and plants • growth (30 minutes) - Prof. Roger Saint-Fort, Mount Royal University, Canada

• Application the technology of AVO forward and inversion to detect hydrocarbon in deep-water depression (30 minutes) - Wan Huan, CNOOC Engineering Company, China

#### **07B** 10 July 2014, 8:30 - 10:15 Location: Ash suite (first floor)

**U**/**D** Location: Ash suite (first floor) Moderator: Prof. Roger Saint-Fort, Mount Royal University, Canada

- Air drive CRC down -the -hole hammer drilling technology and it's bit structure parameters optimization for NGH drilling (30 minutes) Prof. Shu-Qing Hao, China University of Mining and Technology, China
- Optimization design of progressive cavity pumps via finite element simulations with a fluid-solid interaction model (30 minutes) Prof. HengAn Wu, University of Science and Technology of China, China
- Research of polymer drilling muds impact on core-derived evaluation of reservoirs properties (30 minutes) - Dmitriy Katoshin, Open joint stock company Giprovostokneft, Russia

### **N7C** 10 July 2014, 13:40 - 15:25

**U/U** Location: Oak suite (first floor) Moderator: Prof. Gensheng Li, China University of Petroleum, Beijing, China

- Acoustic communication within the borehole over the drill string (30 minutes) Dr. Katrin Jaksch, Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Germany
- Blowout Risk Assessment Problematic on Present Practices and Suggestion of Improved Approaches (20 minutes) - Pedro Perez, Witt O'Brien's Brasil Technical Manager, Brazil; University of Aberdeen, UK
- Mechanism and Characteristics of Horizontal Wellbore Cleanout by Annular Helical Flow (20 minutes) - Prof. Xianzhi Song, China University of Petroleum, China
- Stress Regime Profile Estimation in a Deep, Fractured Hydrocarbon Bearing Formation (20 minutes) - Reza Sanaee, Robert Gordon University, UK

#### Session 08: Information Technologies & Communication for Change

Chaired by: Prof. Jennifer E. Cross, Colorado State University, USA

#### **08A** 8th July 2014, 15:45-17:30 Location: Elm suite (first floor) Moderator: Dr. R. Mikel Lemons, DM, Odessa College, USA

• Meeting the Global Energy Challenge Faster: The Role of Social Science in Enhancing and Advancing Carbon Mitigation Strategies (40 minutes) - Prof. Jennifer E. Cross, Colorado State University, USA

- Applying Cross-Impact Balance Method to enhance strategic reflection in science and politics - the case of heat consumption in Germany (20 minutes) - Sigrid Prehofer, University of Stuttgart, Germany
- Residential energy-use behavior monitoring and feedback: How to engage consumers (20 minutes) Victor Chen, University of California, USA

### **NGR** 10 July 2014, 13:40 - 15:25

**USB** Location: Ash suite (first floor)

Moderator: Prof. Jennifer E. Cross, Colorado State University, USA

- Security, Safety and High Reliability: On the Results of Interviews to the Japanese ICT Industry (30 minutes) Prof. Toshio Takagi, University of California, USA; Okinawa University, Japan & Prof. Aki Nakanishi, Meiji University, Japan
- Appreciative input management for a more positive, productive organization (20 minutes) Dr. R. Mikel Lemons, DM, Odessa College, USA
- The GÈANT Green Team: practical application of the role of ICT in sustainability efforts (20 minutes) Albert Hankel, SURFnet, The Netherlands
- NRENs and GHG reporting: creating a collaborative environment (20 minutes) George Mamalakis, GRNET, Greece

#### Session 09: ENERGY CONVERSION AND FUELS

Chaired by: Prof. Yiguang Ju, Princeton University, USA

#### **NO** 8 July 2014, 15:45 - 17:50

**UJA** Location: Rowan suite (first floor) Moderator: Prof. Yiguang Ju, Princeton University, United States

- The formation of aerosols during the co-combustion of coal and biomass (30 minutes) Prof. Ange Nzihou, Université de Toulouse, France
- A Numerical Study on In-cylinder Characteristics of Flow and Combustion for Various Operating Conditions in GDI and LPDI Engines (30 minutes) - Prof. Ho-Young Kim, Korea University, Korea
- Efficiency Considerations of Biodiesel-Fuelled Advanced Combustion Engines (30 minutes) - Prof. Timothy J. Jacobs, Texas A&M University, USA

#### **09B** 9 July 2014, 9:40 - 11:25 Location: Pine suite (first floor)

**UJD** Location: Pine suite (first floor) Moderator: Prof. Ange Nzihou, Université de Toulouse, France

- Effect of flow velocity and temperature on minimum ignition energy in laserinduced spark ignition of gaseous fuels (30 minutes) - Alex Borman & Prof Ron Bickerton, University of Lincoln, UK
- Measurements of Ignition Delay Times and Rate Constants using a Shock Tube (20 minutes) - Dr. Aamir Farooq, King Abdullah University of Science and Technology, Saudi Arabia

- Explosion venting of gas engine exhaust systems (20 minutes) Jim Vingerhoets, Fike Europe, Belgium
- Experimental investigation of flow characteristics in an open cavity with upstream injectors (20 minutes) Takahiro Ukai, Tohoku University, Japan

### **NGC** 10 July 2014, 13:40 - 15:25

**UJU** Location: Maple suite (first floor)

Moderator: Prof. Timothy J. Jacobs, Texas A&M University, USA

- Toward the development of predictive capability of combustion phenomena for transport fuels (40 minutes) - Prof. Suk Ho Chung, King Abdullah University of Science and Technology, Saudi Arabia
- Laminar flamelet and partially premixed combustion models in a MGT: new fuels performances and emissions (20 minutes) Vincenza Liguori, University of Naples "Federico II", Italy
- Performance Optimization at Part Load using Gasoline Fumigation (20 minutes) -Dr. Mohamed Mustafa Ali, Zahid Tractor Co, Saudi Arabia
- Effects of Dimethyl Ether on n-Butane Oxidation (20 minutes) Tugce Bekat, Yildiz Technical University, Turkey

#### Session 10: ENERGY HARVESTING

Chaired by: Prof. Sondipon Adhikari, Swansea University, UK Prof. Grzegorz Litak, Lublin University of Technology, Poland

#### **10A** 9 July 2014, 10:35 - 12:20 Location: Rowan suite (first floor)

Moderator: Prof. Ephrahim Garcia, Cornell University, USA

- Nonlinear analysis of energy harvesting system with fractional order physical properties (40 minutes) Prof. Grzegorz Litak, Lublin University of Technology, Poland
- Modeling Photophysics in Organic Conjugated candidates for technological applications (20 minutes) - Prof. Sebastian Fernandez-Alberti, Universidad Nacional de Quilmes, Argentina
- Nonlinear behaviors of micromachined SOI devices for energy harvesting application (20 minutes) Dr. Carlo Trigona, University of Catania, Italy
- Multi bond graph modelling for the detection of energy sinks on multibody systems for harvesting application on helicopter (20 minutes) - Benjamin Boudon, Arts et Metiers ParisTech, CNRS, LSIS, France

**10B** 10 July 2014, 8:30 - 10:15 Location: Sycamore suite (ground floor) Moderator: Prof. Vittorio Ferrari, University of Brescia, Italy

- Piezoelectric materials and structures for energy harvesting (30 minutes) Dr. H • Alicia Kim, University of Bath, UK
- Opportunities and Challenges for Non-linear Energy Harvesting using Piezoelectric • Cantilevers (30 minutes) - Dr. Ji-Tzuoh Lin, Ambiharv Inc., USA
- Energy Harvesting in Unique Environs (30 minutes) Prof. Ephrahim Garcia, • Cornell University, USA

## **10C** 10 July 2014, 10:35 - 12:20 Location: Pine suite (first floor)

Moderator: Prof. Francesco Cottone, University of Perugia, Italy

- Techniques and Devices for Improved Energy Harvesting from Vibrations and Motion for Battery-less Sensors (40 minutes) - Prof. Vittorio Ferrari, University of Brescia, Italy
- Semi-analytical computation of probability density functions for nonlinear energy • harvesting systems (20 minutes) - Dr. Wolfram Martens, Technische Universitaet Berlin, Germany
- Electromagnetic Biosensing of Respiratory Rate (20 minutes) Bryson Padasdao, • University of Hawaii at Manoa, USA
- Small-scale elasticity and strength characterization of materials under electric and • magnetic fields by nanoindentation (20 minutes) - Hao Zhou, Peking University, China

#### 10 July 2014, 13:40 - 15:25

Location: Rowan suite (first floor) Moderator: Dr Alicia Kim, University of Bath, United Kingdom

- *The theoretical ultimate magnetoelectric coefficients of magnetoelectric* • composites by optimization design (30 minutes) - Prof. Bin Liu, Tsinghua University, China
- Electrostatic MEMS generator for low-frequency vibration energy harvesting (30 • minutes) - Prof. Francesco Cottone, University of Perugia, Italy
- *Energy harvesting system implanted in human total knee prosthesis* (30 minutes) ٠ - Prof. Mauro Serpelloni, Università di Brescia, Italy

### Session 12: MATERIAL SIMULATION FOR ENERGY APPLICATIONS

Chaired by:

Dr. Tarabay Antoun, Lawrence Livermore National Laboratory, USA Prof. Dr. Ing. Marco Paggi, IMT Institute for Advanced Studies, Italy Prof. Andrea Piccolroaz, University of Trento, Italy

### **121** 8 July 2014, 15:45 - 17:30

**LA** Location: Pine suite (first floor)

Moderator: Dr. Tarabay Antoun, Lawrence Livermore National Laboratory, USA

- Multi-scale Thermoelectricity Simulation: from Quantum Mechanics to System Dynamics (40 minutes) - Prof. Che-Wun Hong, National Tsing Hua University, Taiwan
- Computational homogenization of thin sheets made of polymeric piezoelectric nanofibers (20 minutes) Dr. Claudio Maruccio, University of Salento, Italy
- Modelling of interface cracks in thermodiffusive media with applications to solid oxide fuell cell devices (20 minutes) Lorenzo Morini, University of Trento, Italy
- *Hydraulic Fracturing Simulations by Using Peridynamics* (20 minutes) Dr. Erkan Oterkus, University of Strathclyde, UK

### **19R** 10 July 2014, 13:40 - 15:25

**LCD** Location: Pine suite (first floor) Moderator: Prof. Che-Wun Hong, National Tsing Hua University, Taiwan

- Numerical analysis of an electroneutral computational homogenization formulation for Li-ion battery cells (30 minutes) Prof. Alberto Salvadori, Eindhoven University of Technology, The Netherlands
- Multiphase and multiscale numerical modeling and simulation of PEM fuel cells (30 minutes) - Prof. Hua Meng, Zhejiang University, China
- 2-D simulation of heat and mass transfer effects on charge/discharge characteristics of a solid oxide iron-air battery (20 minutes) Hiroko Ohmori, Konica Minolta, Inc., Japan; Kyoto University, Japan
- What theoretical chemistry can tell us about ionic liquids and their applicability in dye sensitized solar cells (20 minutes) Henry Weber, University of Bonn, Germany

#### Session 13: ENERGY AND SUPERCONDUCTIVITY

Chaired by: Dr. Quan Li, University of Aberdeen, UK

### **13** 10 July 2014, 8:30 - 10:15

**IJA** Location: Oak suite (first floor) Moderator: Prof. David Cardwell FREng, University of Cambridge, United Kingdom

- High temperature superconducting motor system for low carbon emission transportation equipment (40 minutes) Prof. Taketsune Nakamura, Kyoto University, Japan
- Some Aspects of the Physics of the 2nd Generation Coated Conductors at the Transition to the Resistive State (30 minutes) - Prof. Pierre Bernstein, CNRS/ CRISMAT-ENSICAEN and Université de Caen-Basse-Normandie, France
- Application of Superconductors for Offshore Renewable Energy Integration (30 minutes) Dr. Quan Li, University of Aberdeen, UK

#### **13B** 10 July 2014, 10:35 - 12:20 Location: Maple suite (first floor) Moderator: Dr. Quan Li, University of Aberdeen, UK

- Bulk high temperature superconductors for high field applications in the energy sector (40 minutes) Prof. David Cardwell FREng, University of Cambridge, UK
- Fiber Bragg Grating Sensors for Cryogenics and Superconducting Magnet Applications (20 minutes) - Dr. Rajinikumar Ramalingam, Karlsruhe Institute of Technology, Germany
- Investigations on the degradation of critical current in high temperature superconducting tapes in the ITER feeders (20 minutes) Prof. Xingyi Zhang, Lanzhou University, China
- Relaxation of Internal Stresses in Composite Second Generation High Temperature
  Superconductors by Means of High Energy Ion Irradiation (20 minutes) Timofey E. Demikhov, Lebedev Institute of Physics, Russia

#### **13C** 10 July 2014, 13:40 - 15:25 Location: Sycamore suite (ground floor) Moderator: Prof. Taketsune Nakamura, Kyoto University, Japan

- Application of Superconducting Power Cables and Their Future Prospects (40 minutes) Prof. Hiroyuki Ohsaki, The University of Tokyo, Japan
- Superconducting-ferromagnetic shell for magnetic energy harvesting and transmission at a distance (20 minutes) Prof. Carles Navau, Universitat Autònoma de Barcelona, Spain
- Temperature and strain monitoring using Fiber Bragg gratings at cryogenic temperatures (20 minutes) Dr. Tobias Habisreuther, Leibniz-Insitute of Photonic Technology (IPHT) Jena, Germany
- Determination of deformation patterns from electromagnetic response in high temperature superconductors (20 minutes) Prof. Huadong Yong, Lanzhou University, China

#### Session 14: THERMAL BARRIER COATINGS FOR ENERGY EFFICIENT ENGINES Chaired by: Prof. Weixu Zhang, Xi'an Jiaotong University, China

**14A** 9 July 2014, 9:40 - 11:25 Location: Maple suite (first floor) Moderator: Prof. Guan-Jun Yang, Xi'an Jiaotong University, China

- The Challenges of Higher Temperature TBCs (40 minutes) Carlos G. Levi, University of California, Santa Barbara, USA
- Densification Mechanism of EB-PVD Thermal Barrier Coatings by Small Particle Impact (20 minutes) - Prof. Weixu Zhang, Xi'an Jiaotong University, China

- Optimized zirconia thermal barrier coatings (TBC) for efficient systems (20 minutes) Prof. Dr. Saleem Farooq Shaukat, COMSATS Institute of Information Technology, Pakistan
- Understanding the mechanisms for improved oxide scale adhesion in reactive elements doped β-NiAl alloys (30 minutes) Zhao Zhang, Beihang University, China

#### **14B** 10 July 2014, 8:30 -10:15 Location: Maple suite (first floor)

Moderator: Prof. Carlos G. Levi, University of California, Santa Barbara, USA

- *High-temperature turbine coatings in extreme environments* (40 minutes) Gyaneshwara Brewster EngD CEng, Rolls-Royce plc, UK
- Materials, Processing and Interfaces of New Thermal Barrier Coatings for Advanced Gas Turbines (30 minutes) - Prof. Hongbo Guo and Zhao Zhang, Beihang University, China
- Suspension sprayed thermal barrier coatings for combustion engines (20 minutes)
  Philipp Müller, University of Stuttgart, Germany

## **14C** 10 July 2014, 10:35 - 12:20

**I4U** Location: Ash suite (first floor) Moderator: Prof. Weixu Zhang, Xi'an Jiaotong University, China

- Consider radiative heat transfer through TBC in the design of protection systems (30 minutes) Prof. Agnès Delmas, Institut National des Sciences Appliquées de Lyon (INSA), France
- Multi-scale multi-points inter-splat connection enhanced sintering model for plasma-sprayed lamellar TBCs (30 minutes) - Prof. Guan-Jun Yang, Xi'an Jiaotong University, China
- Relationship between lamellar structure and elastic modulus of thermally sprayed thermal barrier coatings with intra-splat cracks (20 minutes) Guangrong Li, Xi'an Jiaotong University, China
- Loss of yttrium during air plasma spraying of NiCrAlY (20 minutes) Panadda Sheppard, National Science and Technology Development Agency, National Metal and Materials Technology Center, Thailand

#### Session 15: MARINE & WIND ENERGYENGINES

#### Chaired by:

Prof. Ian G Bryden FRSE, The University of the Highlands and Islands, UK Dr Athanasios Kolios, Cranfield University, UK Mr. Flemming Rasmussen, DTU Wind Energy, Denmark

### **15** 8 July 2014, 10:35 - 12:20

**IUA** Location: Pine suite (first floor) Moderator: Prof. Stig Munk-Nielsen, Aalborg University, Denmark

- *Marine Energy, a Personal Perspective* (40 minutes) Prof. Ian G Bryden FRSE, The University of the Highlands and Islands,UK
- The key technologies and development of offshore wind farm in China (25 minutes) Prof. Zhi-Xin Wang, Shanghai Jiaotong University, China
- Reliability analysis of complex limit states of floating wind turbines (25 minutes) Dr. Athanasios Kolios, Cranfield University, UK

### **15R** 9 July 2014, 9:40 - 11:25

**IJD** Location: Rowan suite (first floor) Moderator: Prof. Luciano Castillo, Texas Tech University, USA

- Marine Energy News from the north (40 minutes) Neil Kermode, The European Marine Energy Centre (EMEC) Limited, UK
- Operation of Intelligent Wind Power Unit (30 minutes) Toshiaki Kanemoto, Kyushu Institute of Technology, Japan
- Strategic orientation for the ocean energy market roll-out: Coherent technology learning by system dynamics modelling of trans-organisational expert knowledge (20 minutes) - Ralf Bucher, University of Edinburgh, UK

#### **15C** 10 July 2014, 8:30 - 10:15 Location: Pine suite (first floor)

Moderator: Prof. Ian G Bryden FRSE, The University of the Highlands and Islands, UK

- Trends and challenges in wind turbine technology development and modelling (40 minutes) Mr. Flemming Rasmussen, DTU Wind Energy, Denmark
- Preliminary Tests at a Model Smart Wind Farm Facility in Texas (30 minutes) Dr. Arquimedes Ruiz-Columbie, National Wind Resource Center; Texas Tech University, USA
- Offshore Wind a Significant Natural Resource of the North Atlantic (30 minutes)
  Brian Hurley, M.Sc., Wind Site Evaluation Ltd., Ireland

#### **15D** 10 July 2014, 10:35 -12:20 Location: Rowan suite (first floor) Moderator: Mr. Flemming Rasmussen, DTU Wind Energy, Denmark

- Wind Turbine Power Module Tests and Lifetime (30 minutes) Prof. Stig Munk-Nielsen, Aalborg University, Denmark
- Nomadic harvesting of wind energy (20 minutes) Dr. Panagis Vovos, University of Patras, Greece
- Integration of Offshore Transmission Networks in UK (20 minutes) Dr. Biljana Stojkovska, National Grid, UK
- Fleet Monitoring for Distributed Energy Systems (20 minutes) Dipl.-Ing. Marc Hilbert, RWTH Aachen University, Germany

#### Session 17: BIOENERGY

Chaired by:

Prof. David Sinton, University of Toronto, Canada Prof. Jens Bo Holm-Nielsen, Aalborg University, Denmark

## **17** A July 2014, 10:35 - 12:20

**I / A** Location: Maple suite (first floor) Moderator: Prof. Jens Bo Holm-Nielsen, Aalborg University, Denmark

- Optofluidics for Bioenergy: Cell-scale tools for culturing and analyzing photosynthetic microorganisms (40 minutes) Prof. David Sinton, University of Toronto, Canada
- Optimising the Biogas Value Chain: a Stochastic Programming Approach (30 minutes) Nina Juul, Technical University of Denmark, Denmark
- A model organism with efficient mechanisms for energy production and consumption (30 minutes) Dr. Adriana Katz, Weizmann Institute of Science, Israel

## **17R** 9 July 2014, 9:40 - 11:25

**I D** Location: Ash suite (first floor) Moderator: Prof. David Sinton, University of Toronto, Canada

- Bioenergy on the move towards large scale supply! Challenged to be sustainable and very diversified in technologies (40 minutes) - Prof. Jens Bo Holm-Nielsen, Aalborg University, Denmark
- Environmentally Sustainable Biofuels: Advances in Biodiesel Research (30 minutes) - Prof. P.T. Vasudevan, University of New Hampshire, USA
- A citrus waste based biorefinery as a source of renewable energy: advances and engineering challenges (30 minutes) Prof. Kim D. Jones, Texas A&M University Kingsville, USA

### **17** 10 July 2014, 10:35 - 12:20

**I / U** Location: Elm suite (first floor) Moderator: Prof. Kim D. Jones, Texas A&M University Kingsville, USA

- Metabolic Pathway Engineering for Enhanced Biofuel Production (30 minutes)
  Prof. Guangyi Wang, Tianjin University, China; University of Hawaii at Manoa, USA; California Baptist University, USA
- Thermal Pretreatment of Algal Biomass and Lipid-Extracted Algal Byproduct for Enhanced Biogas Generation (30 minutes) - Prof. Michael D. Marsolek, Seattle University, USA
- Coupling algal biodiesel production to waste treatment: a sustainable approach (30 minutes) Prof. Nirupama Mallick, Indian Institute of Technology Kharagpur, India

#### Session 21: SUBSEA INTEGRITY & SUBSEA ENGINEERING

Chaired by:

Dr. Christopher Fowler, Exova Group Limited, UK Dr. Yijun Shen, MCS Kenny / Wood Group Kenny, UK Gavin Mann, CNR International UK

#### **21A** 8 July 2014, 10:35 - 12:20 Location: Ash suite (first floor) Moderator: Mr. Ali Anaturk, Shell International Petroleum Company Limited, UK

- The Cost of Corrosion The Impact Study (40 minutes) Dr. Christopher Fowler, Exova Group Limited, UK
- Comparison of design processes: How industrial design is specified and executed in the Oil Subsea Production Systems (SPS) vs. Shipbuilding industries (20 minutes)
   Luca Abele Piciaccia, Aker Solutions, Norway
- The Effects of Modelling Techniques and Data Uncertainty Wellhead Fatigue Life Calculation (20 minutes) Dara Williams, MCS Kenny, Ireland
- Life of Field Integrity Management of Subsea Assets (20 minutes) Innocent Friday Uwuijaren, FMC Technologies (FKSL CS - Eastern Region), UK

#### **218** 8 July 2014, 13:40 - 15:25 Location: Ash suite (first floor)

Moderator: Dr. Yijun Shen, MCS Kenny / Wood Group Kenny, UK

- Subsea Tunnel construction in unfavourable geological conditions (40 minutes) Prof. Dingli Zhang, Beijing Jiaotong University, China
- Lithium-Ion battery reliability prediction and management for deep diving autonomous underwater vehicles (20 minutes) Dr. Mario P. Brito, National Oceanography Centre, UK
- Subsea Integrity Management Collaboration and Lessons Learned (20 minutes) -Robbie Williamson, MSc, CEng, FIMarEST, Wood Group Kenny, UK
- Third party damages of offshore pipeline (20 minutes) Nurul Sulaiman, University of Aberdeen, UK

### 8 July 2014, 15:45 - 17:30

**L IU** Location: Ash suite (first floor) Moderator: Dr. Christopher Fowler, Exova Group Limited, UK

- Technical challenges of high pressure, high temperature and deepwater operations on subsea flexible risers (20 minutes) - Dr. Yijun Shen, MCS Kenny / Wood Group Kenny, UK
- Flow Induced Piping Vibrations and In-situ Solutions (20 minutes) Ali Anaturk, Shell International Petroleum Company Limited, UK
- Ontology modeling for the Subsea Oil Domain: an initial investigation (20 minutes) Luca Abele Piciaccia, Aker Solutions, Norway

- Offshore Pipelines In-Line Inspection: Practicalities, Planning, and Maximising Benefit (20 minutes) -Glen Littlejohn, Xodus Group, United Kingdom
- (20 minutes) CNR International, UK

#### Session 23: POROUS MATERIALS AND STRUCTURES FOR ENERGY APPLICATIONS

Chaired by: Prof. Jing Li, Rutgers University, USA

## **23** 8 July 2014, 10:35 - 12:20

**LOA** Location: Beechwood suite (ground floor) Moderator: Prof. Jing Li, Rutgers University, USA

- *Metal-organic frameworks, MOFs for cycling heat transformation processes* (40 minutes) Prof. Dr. Christoph Janiak, Universität Düsseldorf, Germany
- Tuning of Porosity, Stability and CO2 Adsorption Properties in Zr-based MOFs via Ligand Functionalization (30 minutes) - Prof. Pantelis N. Trikalitis, University of Crete, Greece
- Solid-state NMR characterization of metal-organic frameworks at ultra-high magnetic field (30 minutes) Prof. Yining Huang, The University of Western Ontario, Canada

### **73R** 8 July 2014, 13:40 - 15:25

**LOD** Location: Beechwood suite (ground floor)

Moderator: Prof. Christoph Janiak, Universität Düsseldorf, Germany

- Luminescent MOFs and Related Applications (40 minutes) Prof. Jing Li, Rutgers University, USA
- [Al8(OH)4(OCH3)8(BDC-NH2)6]: Formation and properties of an Al-based MOF with an unprecedented inorganic building unit (30 minutes) - Prof. Norbert Stock, Christian-Albrechts University of Kiel, Germany
- Natural gas storage in porous metal-organic frameworks (30 minutes) Dr. Wei Zhou, National Institute of Standards and Technology, Gaithersburg; University of Maryland, USA

## **23C** 8 July 2014, 15:45 - 17:30

**LOU** Location: Beechwood suite (ground floor) Moderator: Prof. Sherif A. El-Safty, National Institute for Materials Science, Japan

- Porous and nanostructured electrodes for energy storage devices (40 minutes) Prof. Andreas Stein, University of Minnesota, USA
- Protection of porous dielectric materials to improve microprocessors performance and reduce energy consumption (20 minutes) - Dr. Krystelle Lionti, IBM Almaden Research Center, USA
- Porous Materials and their Chemistry A Structural Introspective (20 minutes) -Dr. Róbert Gyepes, J. Selye University, Slovakia

• Adsorption and Dynamics in Hierarchical Porous Materials (20 minutes) - Dr. Benoit Coasne, Institut Charles Gerhardt Montpellier, France; Massachusetts Institute of Technology, USA

#### **23D** 9 July 2014, 9:40 - 11:25 Location: Beechwood suite (ground floor) Moderator: Prof. Pantelis Trikalitis, University of Crete, Greece

- Pore Engineering of Porous Materials for Hydrogen Storage and Carbon Dioxide Capture Applications (40 minutes) - Prof. Myunghyun Paik Suh, Seoul National University, Korea
- Metal-organic frameworks mesoparticles with tailored morphology ESEM study of their thermodynamics (20 minutes) Dr. Caroline Genre, Marcoule Institute for Separation Chemistry; Laboratory of Molecular Chemistry and Catalysis for Energy Applications, CEA Saclay, France
- Synthesis and Functionalization of Metal–Organic Frameworks with Transition-Metal Complexes (20 minutes) - Fabian Carson, Stockholm University, Sweden
- Magnetic iron oxide/ZIF-8 nanostructures and their catalytic activity (20 minutes)
  Aleksandra Schejn, Université de Lorraine, France

#### **23E** 10 July 2014, 8:30 - 10:15 Location: Beechwood suite (ground floor) Moderator: Prof. Andreas Stein, University of Minnesota, USA

- Integrative Chemitstry-based morphosynthesis of advanced porous materials dedicated to energy conversion (30 minutes) - Prof. Rénal Backov, Université de Bordeaux, France
- Mesoporous metal oxide nanoarchitectures for electrochemical energy storage devices "Influence of size, porosity, and morphology" (30 minutes) Dr. Sherif A. El-Safty, National Institute for Materials Science, Japan
- Strain in supercapacitors: tracking ion movement and pore swelling with in situ electrochemical dilatometry (30 minutes) - Prof. Volker Presser, INM - Leibniz Institute for New Materials; Saarland University, Germany

### **72** 10 July 2014, 10:35 - 12:20

**LOCATION:** Beechwood suite (ground floor) Moderator: Prof. Rénal Backov, Université de Bordeaux, France

- Analytical investigation of heat transfer enhancement (HTE) in a channel under local thermal non-equilibrium condition (20 minutes) Dr. Yasser Mahmoudi, University of Cambridge, UK
- Thermomechanical study of porous materials as candidates energy storage materials (20 minutes) Dr. Isabelle Beurroies, Aix Marseille Université-CNRS, France

- Unexpected effects of ligands on the hydrothermal stability and adsorption of Metal-Organic Frameworks (20 minutes) - Dr. Luca Bellarosa, Institute of Chemical Research of Catalonia, ICIQ, Spain
- Synthesis, Crystal Structure and Magnetic Characterization of a Series of Cull-LnIII Heterometallic [Ln = La, Ce, Pr, Nd and Sm] Metal- Organic Compounds with an Unusual Single Crystal to Single Crystal Phase Transition (20 minutes) - Pau Díaz-Gallifa, Universidad de La Laguna, Spain
- Effects of suction/injection on unsteady reactive variable viscosity non-Newtonian fluid flow in a channel filled with porous medium and convective boundary conditions (20 minutes) Dr Lazarus Rundora, Vaal University of Technology, South Africa

#### **236** 10 July 2014, 13:40 - 15:25 Location: Beechwood suite (ground floor)

**LOC** Location: Beechwood suite (ground floor) Moderator: Prof. Yining Huang, The University of Western Ontario, Canada

- Structural transformations and energy storage in inorganic-organic vanadates (20 minutes) Roberto Fernández de Luis, University of the Basque Country, Spain
- Design and Synthesis of Hydroxide Ion-Conductive Metal–Organic Frameworks Based on Salt Inclusion Reaction (20 minutes) - Dr. Masaaki Sadakiyo, Kyushu University, Japan; Japan Science and Technology Agency, Japan
- Assembly of metal-organic 'paddle-wheel'-compounds to supramolecular coordination polymers (20 minutes) Xu-Min Cai, Technische Universität München, Germany
- Post-Synthetic Modification to Tune Porosity (20 minutes) Gareth O. Lloyd, Heriot-Watt University, Edinburgh, UK
- High Volumetric Uptake in Aluminum Metal-Organic Frameworks (20 minutes) -Dr. Felipe Gándara, University of California - Berkeley, USA; Materials Science Institute of Madrid, CSIC, Madrid, Spain

## Session 24: NUMERICAL AND EXPERIMENTAL RESEARCH ON THE DURABILITY OF PHOTOVOLTAIC MODULES

#### Chaired by:

Dr.-Ing. José Reinoso, Leibniz University of Hannover, Germany Prof. Dr. Ing. Marco Paggi, IMT Institute for Advanced Studies Lucca, Italy Dr. Felix Haase, Institute for Solar Energy Research Hamelin, Germany

### **2 1** 8 July 2014, 10:35 - 12:20

**LAR** Location: Oak suite (first floor) Moderator: Prof. Marco Paggi, IMT Institute for Advanced Studies Lucca, Italy

- Failure of photovoltaic modules under thermo-mechanical stress (40 minutes) -Prof. Dr. Joerg Bagdahn, Director, Fraunhofer-Center for Silicon Photovoltaics; Anhalt University of Applied Sciences, Germany
- Unique features of cylindrical type solar-module contrasted with plane or conventional type ones (Consideration for use in agricultural land) (30 minutes) Prof. Hirohisa Hiraki, Osaka University, Japan
- Microscopic investigation of cell cracks leading to electric isolations and power loss under mechanical load (30 minutes) - Dr. Felix Haase, Institute for Solar Energy Research Hamelin, Germany

#### **24B** 8 July 2014, 13:40 - 15:25 Location: Elm suite (first floor)

Moderator: Dr.-Ing. José Reinoso, Leibniz University of Hannover, Germany

- Electric self-healing and fatigue degradation phenomena in cracked silicon cells (30 minutes) Prof. Dr. Ing. Marco Paggi, IMT Institute for Advanced Studies, Italy
- Effect of PV Module Frame Boundaries on Stresses in Solar Cells (30 minutes) Dr. Johannes Schicker, CTR Carinthian Tech Research AG, Austria
- Interpretations on crack initiation in encapsulated solar cells (30 minutes) Dr. Sascha Dietrich, Fraunhofer Center for Silicon Photovoltaics, Germany

#### Session 25: FUEL CELLS

Chaired by: Prof. Tim Zhao, Hong Kong University of Science & Technology Prof. Hyung-Man Kim, Inje University, Korea

### **25** 8 July 2014, 10:35 - 12:20

**CUA** Location: Elm suite (first floor) Moderator: Prof. Tim Zhao, Hong Kong University of Science & Technology

- Direct Methane Solid Oxide Fuel Cell (40 minutes) Dr. Steven S.C. Chuang, The University of Akron, USA
- Development of Micro flat-tubular Solid Oxide Electrochemical Cells and Modules (40 minutes) - Dr. Toshio Suzuki, National Institute of Advanced Industrial Science and Technology, Japan
- Can complete carbon oxidation be achieved in hybrid direct carbon fuel cells? (20 minutes) Lisa Deleebeeck, Technical University of Denmark Risø Campus, Denmark

### **958** 8 July 2014, 15:45 - 17:30

**Light Location:** Maple suite (first floor)

Moderator: Dr. Toshio Suzuki, National Institute of Advanced Industrial Science and Technology, Japan

• Challenges to Sustainable Energy for Global Environment (40 minutes) - Prof. Hyung-Man Kim, Inje University, Korea

- Some principles of selecting the compositions of doped lanthanum gallate as . electron ionic conductors for SOFC (20 minutes) - Prof. Natalia Chezhina. Sankt-Petersburg State University, Russia
- Development of Solid Oxide Fuel Cell (SOFC) components (20 minutes) Aroa . Morán-Ruiz, University of the Basque Country (UPV/EHU), Spain
- Impact of microstructure on effective material parameters of granular electrode structures (20 minutes) - Julia Ott, Karlsruhe Institute of Technology, Germany

## **L** 10 July 2014, 8:30 - 10:15

**25C** 10 July 2014, 0.50 IOLE Location: Elm suite (first floor) Moderator: Prof. Hyung-Man Kim, Inje University, Korea

- Oxvaen Reduction at Precious Metal-Free Fuel Cell Cathode Catalysts (40 minutes) - Piotr Zelenay, Ph.D, D.Sc., Los Alamos National Laboratory, USA
- Development of ultra-high-spatial resolution scanning hard x-ray microscopy at . NSLS-II and its application to studies of solid-oxide-fuel-cells (30 minutes) - Dr. Hanfei Yan, Brookhaven National Laboratory, USA
- Design and Development of Proton Exchange Membrane Fuel Cell using Open . Pore Cellular Foam as Flow Plate Material (20 minutes) - Ahmad Baroutaii, Dublin City University, Ireland

#### Session 27: NEW ENERGY VEHICLES

Chaired by: Dr. Matthew J. Thornton, National Renewable Energy Laboratory, USA

#### 8 July 2014, 15:45 - 17:30 **H** Location: Oak suite (first floor)

Moderator: Dr. Matthew Thornton, National Renewable Energy Laboratory, USA

- Global Warming and 'Lead–Carbon' Batteries (30 minutes) Dr Patrick T. . Moseley, Journal of Power Sources; International Lead Zinc Research Organization, USA
- Comparative life cycle cost of electric vehicle battery exchange vs. fast charging stations (30 minutes) - Dr. Elizabeth J. Traut, University of Glasgow, UK
- State of Charge Estimation for Lithium-ion batteries in Electric Vehicles using . Extended Kalman Filtering (20 minutes) - Florian Quantmeyer, Ostfalia University of Applied Sciences, Germany
- Effect of vehicle mass reduction on on-board energy storage system in Battery . Electric Vehicle: A Lifecycle Analysis (20 minutes) - Suresh Babu Muttana, Technology Information Forecasting and Assessment Council, India

### **97R** 10 July 2014, 13:40 - 15:25

**LID** Location: Elm suite (first floor) Moderator: Dr Patrick Moseley, International Lead Zinc Research Organization, USA

- Development of a Vehicle-Level Simulation Model for Evaluating the Trade-offs of Advanced On-board Hydrogen Storage Technologies for Fuel Cell Vehicles (30 minutes) - Dr. Matthew J. Thornton, National Renewable Energy Laboratory, USA
- Electric vehicles and urban mobility: CNR-ITAE experiences from R&D projects (20 minutes) Dr. Francesco Sergi, National Research Council of Italy; Institute of Advanced Energy Technologies "Nicola Giordano", Italy
- Vibrational energy harvest and storage for electric vehicles (30 minutes) Prof. Zhengbin Wu, Chinese Academy of Sciences, China
- Examination of operating characteristics of conventional and hybrid electric city buses under real world urban driving conditions (30 minutes) Dr. Seref Soylu, Sakarya University Faculty of Engineering, Turkey

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# THANK YOU

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