Preliminary Program
(March 14, 2016)

Fluidization XV

May 22-27, 2016

Fairmont Le Chateau Montebello
Quebec, Canada

Conference Chair
Jamal Chaouki
Polytechnique de Montréal, Canada

Conference Co-Chairs
Franco Berruti
Western University, Canada
Xiaotao (Tony) Bi
University of British Columbia, Canada
Ray Cocco
PSRI, USA
Sunday, May 22, 2016

16:00 - 18:00  Conference Check-in

18:00 - 20:00  Dinner followed by Reception at the river
Monday, May 23, 2016

06:30 - 08:00  Breakfast
08:00 - 08:15  Opening Remarks

**Plenary 1**

08:15 - 08:45  A few recent developments in fluidized bed technology applications for fuel conversion  
Guangwen Xu, Institute of Process Engineering, China

**Fluidization of Irregular Shape Particles**

09:00 - 09:15  Attrition rate of iron ore in the gas-solid fluidized beds with the wide size distribution  
Dong Hyun Lee, Sungkyunkwan University, Korea

09:15 - 09:30  Spouting behavior of binary mixtures of spherical and cylindrical particles  
Douglas W. Marshall, Battelle Energy Alliance, LLC/Idaho National Laboratory, USA

09:30 - 09:45  Analyzing the fluidization of a mixture of gas- sand-biomass using CFD techniques  
Ricardo de Andrade Medronho, Universidade Federal do Rio de Janeiro, Brazil

09:45 - 10:00  Novel method to measure fine particle circulation rates in draft tube conical spouted beds  
Mikel Tellabide, University of the Basque Country, Spain

10:00 - 10:15  Flow regime identification in fluidized beds by analyzing pressure fluctuations signal based on Kolomogorov entropy approach  
Muthanna Al-Dahhan, Missouri University of Science & Technology, USA

**Micro-Fluidized Bed Reactors**

09:00 - 09:15  Identification of discharge regimes of cyclone dipleg-trickle valve system based on pressure fluctuation profiles  
Yaodong Wei, China University of Petroleum, China

09:15 - 09:30  Numerical and experimental study of particle deposition in a tangential inlet cyclone separator  
Jianfei Song, China University of Petroleum, China

09:30 - 09:45  Jiggle bed reactor for testing catalytic activity of olivine in bio-oil gasification  
Mohammad Latifi, Ecole Polytechnique de Montreal, Canada

09:45 - 10:00  Characteristics of gas back-mixing in micro fluidized bed  
Sulong Geng, Chinese Academy of Sciences, China
Monday, May 23, 2016 (continued)

10:00 - 10:15 Computational fluid dynamics study of CREC riser simulator: Mixing patterns
Hugo de Lasa, University of Western Ontario, Canada

Clean Energy Processes

09:00 - 09:15 Effect of bed particle size on heat transfer between fluidized bed of group B particles and vertical rifled tubes
Artur Blaszczuk, Czestochowa University of Technology, Poland

09:15 - 09:30 Analysis of fluctuations in velocities, voidage and gas concentration in CFB conditions
Juho Peltola, VTT Technical Research Centre of Finland Ltd, Finland

09:30 - 09:45 Validation of the oxygen buffering ability of bed materials used for OCAC in a large scale CFB boiler
Angelica Corcoran, Chalmers University of Technology, Sweden

09:45 - 10:00 Predicting gas-flow distribution in pilot-scale fluidized beds using CFD simulations
Akhilesh Bakshi, Massachusetts Institute of Technology, USA

10:00 - 10:15 Experimental investigation with digital particle image velocimetry for turbulent flow of slender particles in a stirred tank
Long Fan, Memorial University of Newfoundland, Canada

10:15 - 10:45 Coffee Break

Fundamentals

10:45 - 11:00 2D and 3D CFD simulations of lateral solid mixing in gas-fluidized beds
Luca Mazzei, University College London, United Kingdom

11:00 - 11:15 The relationship between fluidized bed electrostatics and entrainment
John R. Grace, University of British Columbia, Canada

11:15 - 11:30 Solid flux in travelling fluidized bed operating in square-nosed slugging regime
Sina Tebianian, University of British Columbia, Canada

11:30 - 11:45 Pattern formation in fluidized and vibrated beds: Experimental and computational insights
Lilian de Martín, University College London, United Kingdom

11:45 - 12:00 Three-dimensional CFD simulation of the regeneration of MgO-based sorbent in a carbon capture process
Hamid Arastoopour, Illinois Institute of Technology, USA
Monday, May 23, 2016 (continued)

12:00 - 12:15  **Force on a single slat during the start-up process of a fluidized bed**  
Duiping Liu, China University of Petroleum, China

12:15 - 12:30  **Hydrodynamics and heat transfer of suspended surface in a supercritical CFB furnace**  
Linjie Xu, Zhejiang University, China

**Coating Technologies and Fluidized Nanoparticles**

10:45 - 11:00  **Pickup velocity of nanoparticles**  
J. Ruud van Ommen, Delft University of Technology, the Netherlands

11:00 - 11:15  **Size distribution prediction of nanoparticle agglomerates in a fluidized bed**  
Andrea Fabre, Technical University of Delft, the Netherlands

11:15 - 11:30  **Effect of design and operating variables on spout diameter in spouted beds using factorial design of experiments approach with the aid of new optical fiber probe**  
Muthanna Al-Dahhan, Missouri University of Science & Technology, USA

11:30 - 11:45  **Fluidization of cohesive nanoparticles with a new pulsation technique**  
Samira Aghaee Sarbarze, Ecole Polytechnique de Montreal, Canada

11:45 - 12:00  **Treatment of polymer powders by combining an atmospheric plasma jet and a fluidized bed reactor**  
Marius Sachs, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany

12:00 - 12:15  **Modeling of ash deposition on the wall of a high temperature thermal reformer**  
Tommaso Melchiori, University of Sherbrooke, Canada

12:15 - 12:30  **CFD-DEM simulation of nanoparticle agglomerates fluidization with a micro-jet**  
Daoyin Liu, Southeast University, China

**Chemical Looping Combustion (CLC)**

10:45 - 11:00  **Carbon dioxide recovery by means of TSA in a sound assisted fluidized bed of fine activated carbon**  
Federica Raganati, Istituto di Ricerche sulla Combustione – CNR, Italy

11:00 - 11:15  **First experience in operation of cold model of FB-CLC-SF (fluidized-bed chemical-looping-combustion solid-fuels) facility**  
Tomasz Czakiert, Czestochowa University of Technology, Poland
Monday, May 23, 2016 (continued)

11:15 - 11:30  A 1.5 model of a complex geometry laboratory scale fluidized bed CLC equipment  
Jaroslaw Krzywanski, Jan Dlugosz University in Czestochowa, Poland

11:30 - 11:45  Reaction characteristics of waste coffee grounds chemical-looping gasification  
Qingjie Guo, Qingdao University of Science & Technology, China

11:45 - 12:00  Effect of steam on the performance of Ca-based sorbents in calcium looping processes  
Fabio Montagnaro, University of Naples 'Federico II', Italy

12:00 - 12:15  Post combustion CO₂ capture from flue gas onto activated carbon in a bubbling fluidized bed  
Lalhmingsanga Hauchhum, National Institute Technology Mizoram, India

12:15 - 12:30  Scale-up of CLC oxygen carriers for gaseous fuels  
Arturo Cabello, Instituto de Carboquímica (ICB-CSIC), Spain

12:30 - 13:30  Lunch

13:30 - 17:00  Networking

Plenary 2

17:00 - 17:30  CFD in fluidized beds: The state of the art  
Olivier Simonin, Institut de Mecanique des Fluides de Toulouse CNRS/INPT/UPS, France

Fundamentals

17:45 - 18:00  Horizontal secondary gas injection in fluidized beds: Solids concentration and velocity in multiphase jets  
Benedikt Köninger, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany

18:00 - 18:15  Prediction of the radial solids concentration distribution in circulating fluidized bed risers  
Timo Hensler, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany

18:15 - 18:30  Sub-grid drag model for immersed vertical cylinders in fluidized beds  
Vikrant Verma, National Energy Technology Laboratory, USA

18:30 - 18:45  Measurement of dynamic forces in fluidized bed systems  
Shyam Sundaram, Particulate Solid Research, Inc., USA
The effect of riser end geometry on gas-solid hydrodynamics in a CFB riser operating above fast fluidization regimes
Ronald W. Breault, DOE/NETL/ORD, USA

Multiscale modeling of pattern formation in pulsed fluidized beds: Continuum and discrete approaches
Kaiqiao Wu, University College London, United Kingdom

Solids maldistribution in parallel cyclones
Ted M. Knowlton, Particulate Solid Research, Inc., USA

Clean Energy Processes

Study on single and multi-phase laminar flow containing spherical or slender particles in a stirred tank using DPIV
Long Fan, Memorial University of Newfoundland, Canada

Heat transfer challenge and design evaluation for a multi-stage temperature swing adsorption (TSA) process
Gerhard Hofer, University of Natural Resources and Life Sciences, Austria

Hydrodynamics of compartmented fluidized beds for concentrated solar power applications
Roberto Solimene, Consiglio Nazionale delle Ricerche/Istituto di Ricerche sulla Combustione, Italy

Mass transfer in fluidized bed reactors using a novel non-invasive, whole field and high temporal resolution infra-red technique
Jose A. Medrano, Eindhoven University of Technology, the Netherlands

Investigating the performance of different fluidized bed membrane reactor geometries
Ramon Voncken, Eindhoven University of Technology, the Netherlands

Characterization of fuel segregation in a fluidized bed by magnetic particle tracking
David Pallarès, Chalmers University of Technology, Sweden

Experimental characterization of operational regimes in low aspect-ratio CFB risers
Tove Karlsson, Chalmers University of Technology, Sweden

Thermal and Catalytic Cracking

Measurement of penetration and cycle time of jets from an industrial fluid coking spray nozzle
Francisco J. Sanchez Careaga, Western University/ICFAR, Canada
Monday, May 23, 2016 (continued)

18:00 - 18:15 Effect of local hydrodynamics on the distribution of a liquid sprayed into a Fluidized Bed
Ben Li, Western University/ICFAR, Canada

18:15 - 18:30 CFD simulation of hydrodynamic characteristics in a modified internally circulating fluidized bed mixer
Mengxi Liu, China University of Petroleum, China

18:30 - 18:45 Hydrodynamics of high velocity circulating fluidized bed risers
Allan S. Issangya, Particulate Solid Research, Inc., USA

18:45 - 19:00 Analysis of particle trajectories in a quick-contact cyclone reactor using discrete phase model (DPM)
Liyun Zhu, China University of Petroleum, China

19:00 - 19:15 Pyrolysis characteristics of fat from Nannochloropsis sp. and its effect on pyrolysis of all components
Qingjie Guo, Qingdao University of Science and Technology, China

19:15 - 19:30 Influence of catalyst conditioning on products in a continuously operated FCC pilot plant
Matthias Swoboda, Vienna University of Technology, Austria

19:30 - 20:30 Dinner

20:30 - 22:30 Poster Session and Social
Tuesday, May 24, 2016

06:30 - 08:00  Breakfast

08:00 - 08:15  Remarks

Plenary 3

08:15 - 08:45  Mixing and segregation in fluidized bed thermochemical conversion of biomass
Piero Salatino, Universita Degli Studi Di Napoli Federico II, Italy

Fluidization of Irregular Shape Particles

09:00 - 09:15  The understanding of silicon sequential elutriation behaviour
Eloi Kewes, LTDS, France

09:15 - 09:30  The effects of virtual mass force and particle aspect ratio on orientation of slender particles in a stirred tank
Long Fan, Memorial University of Newfoundland, Canada

09:30 - 09:45  Experimental and theoretical study drying of bulk kohlrabie by applying combined fluidized bed with microwave heat source
Bizhan Honarvar, Azad University, Iran

09:45 - 10:00  Heat transfer study in corrugated wall bubbling fluidized bed reactor: Experiments and CFD simulations
Alam Nawaz Khan Wardag, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Pakistan

10:00 - 10:15  Pulsation-assisted fluidized bed for the fluidization of high moisture and irregular particles and its application for brown coal fluidization
Yuping Liu, IHI Corporation, Japan

Micro-Fluidized Bed Reactors + Thermal and Catalytic Cracking

09:00 - 09:15  Flow regime map of a liquid-solid micro-circulating fluidized bed
Vladimir Zivkovic, Newcastle University, United Kingdom

09:15 - 09:30  Flow hydrodynamic study in a micro-fluidized bed of Geldart group a, b and c powders
Nouria Fatah, Unité de Catalyse et de Chimie du Solide, France

09:30 - 09:45  Partial slip boundary conditions for collisional granular flows at flat frictional walls
Lei Yang, Eindhoven University of Technology, the Netherlands

09:45 - 10:00  Operational improvement of isobutane dehydrogenation in fluidization bed reactor
Khaja Aliuddin Sharief, SABIC, Saudi Arabia
Tuesday, May 24, 2016 (continued)

10:00 - 10:15  Thermal decomposition of rare earth elements bearing minerals in a fluidized bed  
Adrian Carrillo Garcia, École Polytechnique de Montréal, Canada

**Polymerization Processes**

09:00 - 09:15  The influence of particle surface friction on the behavior of gas-fluidized beds: Development of a two fluid model  
Lei Yang, Eindhoven University of Technology, the Netherlands

09:15 - 09:30  Application of multiphase flow CFD in the gas phase polymerization process  
Mayank Kashyap, Saudi Basic Industries Corporation (SABIC), USA

09:30 - 09:45  CFD-DEM modeling of fluidized beds with heat production: Influence of the particle size distribution and heat source  
Zizi Li, Eindhoven University of Technology, the Netherlands

09:45 - 10:00  Reactive hybrid Eulerian/Lagrangian Two Fluid Model (TFM) simulation of industrial scale olefin polymerization fluidized bed reactors  
Pablo Aguayo, Borealis Innovation Process Technology, Austria

10:00 - 10:15  Dynamic behavior of fluidized bed reactors for gas phase LLDPE polymerization  
Mpho Setlhaku, SABIC T&I, the Netherlands

10:15 - 10:45  Coffee Break

**Fundamentals**

10:45 - 11:00  Modeling the gas-solid flow in diameter-changing fluidized beds  
Xinhua Liu, Chinese Academy of Sciences, China

11:00 - 11:15  Experimental and simulation study on heat transfer in fluidized beds with heat production: An integrated DIA/PIV/IR technique and CFD-DEM  
Zizi Li, Eindhoven University of Technology, the Netherlands

11:15 - 11:30  Numerical studies on effects of particle rotation in gas-solid flows  
Qiang Zhou, Xi'an Jiaotong University, China

11:30 - 11:45  Characterization of wake properties in freely bubbling fluidized beds using Particle Image Velocimetry  
Jose A. Medrano, Eindhoven University of Technology, the Netherlands

11:45 - 12:00  Collision dynamics of colliding wet solids: Rebound and rotation analysis  
Britta Crüger, Hamburg University of Technology, Germany
Tuesday, May 24, 2016 (continued)

12:00 - 12:15  Discrete element method simulations of Geldart Group a particles in a micro fluidized
   Tingwen Li, National Energy Technology Laboratory, USA

12:15 - 12:30  Multi-scale simulation of gas solid fluidization based on EMMS-DPM
   Wei Ge, IPE,CAS, China

**Thermal and Catalytic Cracking**

10:45 - 11:00  Thermal cracking of canola oil in a continuously operating pilot plant
   Josef Fimberger, Vienna University of Technology, Austria

11:00 - 11:15  Effect of interactions between spray jets on liquid distribution in a fluidized bed
   Helal Elkolaly, ICFAR, Canada

11:15 - 11:30  Impact of local fluidized bed hydrodynamics on interactions between particles and gas-liquid sprays
   Maryam Mohagheghi, ICFAR, Canada

11:30 - 11:45  Development and study of measurement methods for bogging in a fluidized bed
   Cedric Briens, ICFAR, Canada

11:45 - 12:00  Coproduction of liquids and syngas via residue oil cracking-coke gasification (RCCG) process
   Yuming Zhang, China University of Petroleum, China

12:00 - 12:15  Modeling FCC spent catalyst regeneration with computational fluid dynamics
   Raj Singh, Technip Stone & Webster Process Technology, USA

12:15 - 12:30  Riser hydrodynamics and cluster characterization by Particle Image Velocimetry (PIV) and Digital Image Analysis (DIA) coupling
   Alvaro Carlos Varas, Eindhoven University of Technology, the Netherlands

**Clean Energy Processes**

10:45 - 11:00  Continuous temperature swing adsorption in a multi-stage fluidized bed system: First experimental results from CO₂ capture
   Florian Dietrich, Vienna University of Technology, Austria

11:00 - 11:15  Design and performance of a two-stage fluidized bed heat exchanger for a particle-receiver solar power plant
   Gilles Flamant, PROMES-CNRS, France

11:15 - 11:30  An experimental study on heat transfer in liquid-solid packed fluidization
   Debapriya Mandal, Bhabha Atomic Research Centre, India
11:30 - 11:45  Research and simulation of fast, strong exothermic reaction in gas-solid fluidized bed about temperature distribution and hot spot problem
Zhao Jia, Tsinghua University, China

11:45 - 12:00  Dense gas-particle suspension upward flow used as heat transfer fluid in solar receiver: PEPT experiments and 3D numerical simulations
Renaud Ansart, LGC-INPT, France

12:00 - 12:15  Adsorption of CO$_2$ in a confined fluidized bed of a pelletized 13X zeolite: Comparison of results with the conventional technique
Brunello Formisani, University of Calabria, Italy

12:15 - 12:30  Influence of bubble bursting on heat transfer phenomena in directly irradiated fluidized beds
Claudio Tregambi, Università degli Studi di Napoli Federico II, Italy

12:30 - 13:30  Lunch

13:30 - 17:00  Networking

**Plenary 4**

17:00 - 17:30  Fluidized bed chemical reactors – Old and new applications
Leslaw Mleczko, Bayer Technology Services GmbH, Germany

**Fundamentals**

17:45 - 18:00  Determination of particle mixing rates using the two fluid model
Mohammad Banaei, Eindhoven University of Technology, the Netherlands

18:00 - 18:15  Direct numerical simulations of collision dynamics of wet particles
Yali Tang, Eindhoven University of Technology, the Netherlands

18:15 - 18:30  Effect of pressure and gas velocity on residence time of particles susceptible to entrainment in gas-solid fluidized beds
Marc-Andre Seguin, University of Ottawa, Canada

18:30 - 18:45  Characterization of loop seal in a complex circulating fluidized bed system
Dawei Wang, The Ohio State University, USA

18:45 - 19:00  CFD simulation of the influence of suspension section on the hydrodynamics of CFB riser
Wei Wang, Chinese Academy of Science, China

19:00 - 19:15  Fluid-dynamic study on a multi-stage fluidized bed column for continuous CO$_2$ capture via temperature swing adsorption
Egon Zehetner, Vienna University of Technology, Austria
New hybrid CPU-GPU solver for CFD-DEM simulation of fluidized bed
Reza Zarghami, University of Tehran, Iran

**Chemical Looping Combustion (CLC)**

Dynamic flowsheet simulation of gas and solids flows in a system of coupled fluidized bed reactors for chemical looping combustion
Johannes Haus, Hamburg University of Technology, Germany

Numerical simulation of hydrogen production by chemical looping reforming in a dual interconnected fluidized bed reactor
Giuseppe Diglio, Università degli Studi del Sannio, Italy

Measurement of solids circulation rates with optical techniques in circulating beds and comparison to pressure drop methods
Jose A. Medrano, Eindhoven University of Technology, the Netherlands

A twin-bed test reactor for characterization of calcium looping sorbents
Antonio Coppola, Istituto di Ricerche sulla Combustione – CNR, Italy

Feasibility of fluidized bed reactor systems for pressurized chemical looping combustion of natural gas
Florian Zerobin, University of Natural Resources and Life Sciences, Austria

Hydrodynamics of chemical looping combustion systems: Effects of reactor design parameters
Dawei Wang, The Ohio State University, USA

Determination of solids circulation rate through magnetic tracer tests
Diana Carolina Guío Pérez, National University of Colombia, Colombia

**Encapsulation + Composites**

Spouted bed design considerations for coated nuclear fuel particles
Douglas W. Marshall, Battelle Energy Alliance, LLC/Idaho National Laboratory, USA

Single-step encapsulation of magnetic iron oxide nanoparticles in a jet-assisted fluidized bed using photo-initiated chemical vapour deposition
Donya Farhanian, Ecole Polytechnique de Montreal, Canada
Tuesday, May 24, 2016 (continued)

18:15 - 18:30  Investigations on Tribocharging behaviour of pharmaceutical powders in a fluidized bed dryer  
Lifeng Zhang, University of Saskatchewan, Canada

18:30 - 18:45  Conformal multilayer coatings on fine silica microspheres by atmospheric pressure fluidized bed chemical vapor deposition  
Sajjad Habibzadeh, Polytechnique Montreal, Canada

18:45 - 19:00  High-efficiency mixing of fine powders via sound assisted fluidized bed for metal foam production by an innovative cold gas dynamic spray deposition method  
Paola Ammendola, Istituto di Ricerche sulla Combustione – CNR, Italy

19:00 - 19:15  Using of spouted bed spray granulation process for fabricating of metal/ceramic-polymer composites  
Eduard Eichner, Hamburg University of Technology, Germany

19:15 - 19:30  Catalyst preparation for fluidized bed reactors by spray drying  
Nooshin Saadatkah, École Polytechnique de Montréal, Canada

19:30 - 20:30  Dinner

20:30 - 22:30  Poster Session and Social
Wednesday, May 25, 2016

06:30 - 08:00  Breakfast

Plenary 5
08:00 - 08:30  CLC, a promising concept with challenging development issues
Thierry Gauthier, IFPEN, France

Plenary 6
08:30 - 09:00  Chemical looping gasification and reforming – A perspective and prospects of novel circulating fluidized bed systems
Liang-Shih Fan, The Ohio State University, USA

Chemical Looping Combustion (CLC)
09:15 - 09:30  Regime transition and reactor performance in a vertically inserted membrane fluidized bed for pure hydrogen production
Abdelghafour Zaabout, SINTEF Materials and Chemistry, Norway

09:30 - 09:45  Metal oxides in fluidized bed conversion systems
Tobias Mattisson, Chalmers University of Technology, Sweden

09:45 - 10:00  Modelling of a chemical looping combustion system equipped with a two-stage fuel reactor
Antonio Coppola, Istituto di Ricerche sulla Combustione – CNR, Italy

10:00 - 10:15  CLC oxygen carriers produced by deposition of sewage sludge ash during fluidized bed combustion
Massimo Urciuolo, Istituto di Ricerche Sulla Combustione - CNR, Italy

10:15 - 10:30  Modelling study of two chemical looping reforming reactor configurations: Looping vs. switching
Joana F. Morgado, University of Coimbra/Norwegian University of Science and Technology, Norway

10:30 - 10:45  The effect of gas extraction through vertical membranes on the bubble hydrodynamics in a fluidized bed reactor
Solomon Assefa Wassie, Norwegian University Of Science And Technology, Norway

Coating Technologies and Fluidized Nanoparticles
09:15 - 09:30  CFDEM® modelling of particle coating in a three-dimensional prismatic spouted bed
Swantje Pietsch, Hamburg University of Technology, Germany
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:30 - 09:45</td>
<td>De-agglomeration of nanoparticles in an impactor-assisted fluidized bed</td>
<td>Hamed Nasri Lari, Ecole Polytechnique of Montreal, Canada</td>
</tr>
<tr>
<td>09:45 - 10:00</td>
<td>Pressure and X-ray tomography characterization of the fluidization behavior of TiO₂ nanoparticles</td>
<td>Jesus Gomez-Hernandez, Carlos III University of Madrid, Spain</td>
</tr>
<tr>
<td>10:00 - 10:15</td>
<td>Mixing and separation of liquid-liquid two-phase in a novel cyclone reactor of isobutane alkylation catalyzed by ionic liquid</td>
<td>Mingyang Zhang, China University of Petroleum, China</td>
</tr>
<tr>
<td>10:15 - 10:30</td>
<td>Multi-scale characteristics of vibration acceleration signals in vapor-liquid-solid fluidized bed evaporator</td>
<td>Xiaoping Xu, Tianjin University, China</td>
</tr>
<tr>
<td>10:30 - 10:45</td>
<td>Reduction of hematite (Fe₂O₃) to metallic iron (Fe) by CO in a micro fluidized bed reaction analyzer: A multistep kinetics study</td>
<td>Hongsheng Chen, Chongqing University, China</td>
</tr>
</tbody>
</table>

**Biomass to Chemicals**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:15 - 09:30</td>
<td>Modeling and process features of plug flow reactor with internal recirculation for biomass pyrolysis</td>
<td>Kamal Adham, Hatch Ltd, Canada</td>
</tr>
<tr>
<td>09:30 - 09:45</td>
<td>Technology development for the production of hydrocarbons from fast pyrolysis of kraft black liquor</td>
<td>Xuantian Li, NORAM Engineering and Constructors Ltd., Canada</td>
</tr>
<tr>
<td>09:45 - 10:00</td>
<td>Cold flow modelling of char concentration in the recirculated bed material stream of a dual fluidized bed steam gasification system</td>
<td>Stephan Kraft, Bioenergy2020+ GmbH, Austria</td>
</tr>
<tr>
<td>10:00 - 10:15</td>
<td>Measurement of solids circulation rate in a high temperature dual fluidized bed pilot plant</td>
<td>M. Hafizur Rahman, The University of British Columbia, Canada</td>
</tr>
<tr>
<td>10:15 - 10:30</td>
<td>Assessment of new scale-up methodology of hydrodynamics similarity in gas-solid fluidized beds using advanced non-invasive measurement techniques (CT and RPT)</td>
<td>Muthanna Al-Dahhan, Missouri University of Science and Technology, USA</td>
</tr>
<tr>
<td>10:30 - 10:45</td>
<td>The role of fuel mixing on char conversion in a dual fluidized bed gasifier</td>
<td>Louise Lundberg, Chalmers University of Technology, Sweden</td>
</tr>
<tr>
<td>10:45 - 11:15</td>
<td>Coffee Break</td>
<td></td>
</tr>
</tbody>
</table>
**Chemical Looping Combustion (CLC)**

11:15 - 11:30  
On the novel Chemical Switching Reforming (CSR) reactor for hydrogen production with integrated CO₂ capture  
Solomon Assefa Wassie, Eindhoven University of Technology, the Netherlands

11:30 - 11:45  
Validation of a pressure fluctuation technique to detect densified zone formation in fluidized bed membrane reactors  
Abdelghafour Zaabout, SINTEF Materials and Chemistry / TUe Eindhoven, Netherlands

11:45 - 12:00  
Operating experience of a 50kWth methane chemical looping reactor  
Samuel C. Bayham, ORISE/NETL/DOE, USA

12:00 - 12:15  
The performance of air and fuel reactors in a chemical looping combustion plant  
Raffaella Ocone, Heriot-Watt University, United Kingdom

12:15 - 12:30  
Hydrodynamic behaviour of coal and bottom ash mixtures in a fluidized bed gasifier  
Shantanu Roy, Indian Institute of Technology – Delhi, India

**Fundamentals**

11:15 - 11:30  
Situating the dense suspension upflow regime with the EMMS model  
Wei Wang, Chinese Academy of Science, China

11:30 - 11:45  
Determination of the tensile strength of a particulate solid by the raining bed method  
Brunello Formisani, University of Calabria, Italy

11:45 - 12:00  
Hydrodynamic study of heat transfer in a fluidized bed by discrete particle simulations  
Lijing Mu, Eindhoven University of Technology, Netherlands

12:00 - 12:15  
Hydrodynamic studies in continuous countercurrent bubble column: Flow regimes, pressure drop and gas holdup  
Rahul Trivedi, Indian Institute of Technology Madras, India

12:15 - 12:30  
Parametric simulations of liquid-solid fluidized beds using kinetic-theory granular flow model  
Aditya U. Karnik, CD-Adapco, India

**Biomass to Chemicals**

11:15 - 11:30  
Biomass gasification by fluidized bed two-stage process for fuel gas production  
Xi Zeng, Chinese Academy of Sciences, China
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Speaker/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 - 11:45</td>
<td>The segregation of biomass in bubbling fluidized beds</td>
<td>Mark Gilbertson, University of Bristol, United Kingdom</td>
</tr>
<tr>
<td>11:45 - 12:00</td>
<td>Hydrodynamic study of a circulating fluidized bed used for biomass gasification between 20 °C and 900 °C</td>
<td>Sébastien Pécate, CNRS LGC Toulouse, France</td>
</tr>
<tr>
<td>12:00 - 12:15</td>
<td>Evaluating the impact of feed location on the bubbling fluidized bed gasification of biomass</td>
<td>Benjamin Bronson, NRCan/CanmetENERGY, Canada</td>
</tr>
<tr>
<td>12:15 - 12:30</td>
<td>Comparison of multi-component kinetic relations on bubbling fluidized-bed woody biomass fast pyrolysis reactor model performance</td>
<td>Johnny Matta, University of Ottawa, Canada</td>
</tr>
<tr>
<td>12:30 - 13:30</td>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>13:30 - 17:00</td>
<td>Networking</td>
<td></td>
</tr>
<tr>
<td>17:00 - 19:00</td>
<td>Poster Session and Cocktail</td>
<td></td>
</tr>
<tr>
<td>19:00 - 22:30</td>
<td>Banquet</td>
<td></td>
</tr>
</tbody>
</table>
Thursday, May 26, 2016

06:30 - 08:00  Breakfast

**Plenary 7**

08:00 - 08:30  Surface engineering and vapor phase technologies for coating and functionalizing complex objects and small particles  
Ludvik Martinu, Polytechnique Montreal, Canada

**Fundamentals**

08:45 - 09:00  DEM-CFD simulation for mixing process of binary particles with large size difference in a bubbling fluidized bed  
Kyohei Higashida, Osaka University, Japan

09:00 - 09:15  Hydrodynamics of bottom restrained continuous countercurrent systems  
Renganathan Thiruvengadam, Indian Institute of Technology, India

09:15 - 09:30  The sensitivity of filtered Two Fluid Models to the underlying resolved simulation setup  
Jan Hendrik Cloete, Norwegian University of Science and Technology, Norway

09:30 - 09:45  Particle dynamics in 3D gas-solid fluidized beds quantified by real-time magnetic resonance imaging  
Alexander Penn, University and ETH Zurich, Switzerland

09:45 - 10:00  X-Ray imaging for design of gas nozzles in large scale fluidized bed reactors  
Massimiliano Materazzi, University College London, United Kingdom

10:00 - 10:15  Monitoring of the hydrodynamic instabilities in conical spouted beds by recurrence plot analysis of pressure fluctuations and acoustic emission signals  
Navid Mostoufi, University of Tehran, Iran

**Coating Technologies and Fluidized Nanoparticles**

08:45 - 09:00  Heat transfer characteristics of the vapor-liquid-solid boiling flow in a fluidized bed evaporator  
Min An, Tianjin University, China

09:00 - 09:15  Long-term transients in fluidization of oxide nanoparticle agglomerates  
Samir Salameh, Delft University of Technology, the Netherlands

09:15 - 09:30  Gas-phase carbon coating of LiFePO₄ for rechargeable batteries  
Samira Aghaee Sarbarze, Ecole Polytechnique de Montreal, Canada
Thursday, May 26, 2016 (continued)

09:30 - 09:45  Effect of sieving and isopropanol on the fluidization behavior of TiO$_2$ nanoparticles
Jesus Gomez-Hernandez, Carlos III University of Madrid, Spain

09:45 - 10:00  Estimating the size of agglomerates in nanoparticles fluidization: Role of electric double layer force
Maryam Tahmasebpoor, University of Tabriz, Iran

10:00 - 10:15  Fluidized bed rheometry – Science, practice and industrial applications
Denis Schütz, Anton Paar GmbH, Austria

**Lignin and Wood Products + Biomaterials and Fibers**

08:45 - 09:00  Comparison of optical probes and X-ray tomography for bubble characterization in fluidized bed methanation reactors
Frank Schillinger, Paul Scherrer Institut, Switzerland

09:00 - 09:15  Gas-solid conversion of lignin to carboxylic acids
Samira Lotfi, Ecole Polytechnique de Montreal, Canada

09:15 - 09:30  Combustion of lignin-rich residues with coal in a pilot-scale bubbling fluidized bed reactor
Roberto Solimene, Consiglio Nazionale delle Ricerche/Istituto di Ricerche sulla Combustione, Italy

09:30 - 09:45  Gasification of torrefied biomass with carbon dioxide in a bubbling fluidized bed gasifier
Keng-Tung Wu, National Chung Hsing University, Taiwan

09:45 - 10:00  Experimental validation of CFD hydrodynamic models for catalytic fast pyrolysis (CFP)
Bruce Adkins, KiOR, USA

10:00 - 10:15  Expansion properties of Alginate beads as cell carrier in the fluidized bed bioartificial liver
Seyed Danial Naghib, Universita della Calabria, Italy

10:15 - 10:45  Coffee Break

**Plenary 8**

10:45 - 11:15  CFB reactor to CFB combustor - The R&D of CFB combustion in China
Guangxi Yue, Tsinghua University, China
Thursday, May 26, 2016 (continued)

**Fundamentals**

11:15 - 11:30  Pressure drop, phase holdup and flow regimes in cocurrent downward liquid-liquid extraction column  
T. Renganathan, Indian Institute of Technology Madras, India

11:30 - 11:45  Applications of tribology and fracture mechanics to determine wear and impact attrition of particulate solids in CFB systems  
Samuel C. Bayham, ORISE/NETL/DOE, USA

11:45 - 12:00  Experimental study of solid mixing mechanism in a 2D fluidized bed  
Javier Sánchez-Prieto, Universidad Carlos III de Madrid, Spain

12:00 - 12:15  Microscopic modelling of capillary liquid bridge force and volume repartition for DEM simulations of polydisperse systems  
Alberto Di Renzo, University of Calabria, Italy

12:15 - 12:30  Reversal of gulf stream circulation in a vertically vibrated triangular fluidized bed  
Eduardo Cano-Pleite, Universidad Carlos III de Madrid, Spain

12:30 - 12:45  Evaluation of the minimum fluidization velocity at elevated temperature and pressure through experiments and modelling  
Jan Hendrik Cloete, Norwegian University of Science and Technology, Norway

12:45 - 13:00  An improved contact detection algorithm for DEM modeling of polydisperse systems: Application to coal-ash mixture fluidization  
Shantanu Roy, Indian Institute of Technology – Delhi, India

**Fluidization of Irregular Shape Particles**

11:15 - 11:30  Characteristics of a semi-industrial downer reactor for the rounding of irregular polymer particles  
Marius Sachs, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany

11:30 - 11:45  Simulation of segregation in a fluidized bed by CFD-DEM by using similarities  
Zhihong Liu, IHI Corporation, Japan

11:45 - 12:00  The relevance of surface impurities on the effect of temperature on powder flow behavior  
Roberto Chirone, University College London, United Kingdom

12:00 - 12:15  Analysis of industrial reactive powders flow properties at high temperature  
Domenico Macri, University College London, United Kingdom

12:15 - 12:30  Recirculating fluidized bed reactor for chemical-looping  
Raman Sharma, Birla Institute of Technology and Science Pilani, Rajasthan, India
DEM simulation of wood pellets dynamics in a mechanically fluidized reactor
Maksym Dosta, Hamburg University of Technology, Germany

Bubbling and fluidization behaviour in a fluidized bed of binary mixtures with biomass particles
Lifeng Zhang, University of Saskatchewan, Canada

Clean Energy Processes

High solar flux heating of upflow bubbling fluidized bed circulating in opaque vertical tube - 3D numerical simulation
Renaud Ansart, LGC-INPT, France

Segregation of equal-sized particles of different densities in a vertically vibrated fluidized bed
Eduardo Cano-Pleite, Universidad Carlos III de Madrid, Spain

Fundamentals of rotating fluidized beds and application to particle separation
Justin M. Weber, NETL/DOE, USA

Parametric analysis of hydrogen production by dimethyl ether (DME) steam reforming in a fluidized bed system
Yassir T. Makkawi, American University of Sharjah, United Arab Emirates

Numerical investigation of an industrial scale circulating fluidized bed furnace: Effects of position of coal feeders and coal feeding rates
Massoud Massoudi Farid, Yonsei University, South Korea

Induction heating fluidized bed reactor for coal-based cofiring tests
Mohammad Latifi, Ecole Polytechnique de Montreal, Canada

Cold flow modelling of dual fluidized bed pyrolysis
Andreas Frohner, University of Natural Resources and Life Sciences, Austria

Fundamentals

Mechanism of particle build-up on gas-solid fluidization column wall due to electrostatic charge generation
Di Song, University of Ottawa, Canada

Force on a large sphere immersed in an expanded water-fluidized bed over a wide range of voidage values
Alberto Di Renzo, University of Calabria, Italy
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
<th>Institution</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:30 - 17:45</td>
<td><strong>Investigation of agglomerates growth mechanism for thermal seawater desalination</strong></td>
<td>Atsushi Tsutsumi, The University of Tokyo, Japan</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>17:45 - 18:00</td>
<td><strong>Transitions in beds of aerated powders</strong></td>
<td>Clive E. Davies, Massey University, New Zealand</td>
<td>New Zealand</td>
<td></td>
</tr>
<tr>
<td>18:00 - 18:15</td>
<td><strong>Control of particle circulation rate in circulating fluidized bed by a pulsed gas flow</strong></td>
<td>Masanori Ishizuka, The University of Tokyo, Japan</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>18:15 - 18:30</td>
<td><strong>Similarities between gas-solid fluidization in the presence of interparticle forces at high temperature and induced by a polymer coating approach</strong></td>
<td>Jaber Shabanian, Polytechnique Montreal, Canada</td>
<td>Canada, Canada</td>
<td></td>
</tr>
<tr>
<td>18:30 - 18:45</td>
<td><strong>Radial behavior of hydrodynamics in a gas-solids high density circulating fluidized bed downer</strong></td>
<td>Chengxiu Wang, China University of Petroleum, China</td>
<td>China</td>
<td></td>
</tr>
<tr>
<td>18:45 - 19:00</td>
<td><strong>Comparison of bubbles hydrodynamics in gas-solid bubbling bed obtained from TFM and DEM Simulation</strong></td>
<td>Jinsen Gao, China University of Petroleum, China</td>
<td>China</td>
<td></td>
</tr>
</tbody>
</table>

**Thermal and Catalytic Cracking**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
<th>Institution</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:00 - 17:15</td>
<td><strong>Particle cluster sizing in downer units. An applicable across downer scale methodology</strong></td>
<td>Angel Lanza, University of Western Ontario, Canada</td>
<td>Canada, Canada</td>
<td></td>
</tr>
<tr>
<td>17:15 - 17:30</td>
<td><strong>Riser model of a Resid Fluid Catalytic Cracker (RFCC) unit</strong></td>
<td>Mohammad A. Rakib, TAKREER Research Centre, United Arab Emirates</td>
<td>United Arab Emirates</td>
<td></td>
</tr>
<tr>
<td>17:30 - 17:45</td>
<td><strong>Stability analysis of gas solids separation in scaling-up fluidized bed reactors</strong></td>
<td>Chenxi Zhang, Tsinghua University, China</td>
<td>China</td>
<td></td>
</tr>
<tr>
<td>17:45 - 18:00</td>
<td><strong>Micro/Meso simulations of a fluidized bed with heat transfer</strong></td>
<td>Florian Euzenat, IFP Energies Nouvelles, France</td>
<td>France, France</td>
<td></td>
</tr>
<tr>
<td>18:00 - 18:15</td>
<td><strong>CFD analysis of circulating fluidized beds</strong></td>
<td>Aditya Karnik, CD-Adapco, India</td>
<td>India</td>
<td></td>
</tr>
<tr>
<td>18:15 - 18:30</td>
<td><strong>Complex reactions in an FCC riser reactor</strong></td>
<td>Raffaella Ocone, Heriot-Watt University, United Kingdom</td>
<td>United Kingdom</td>
<td></td>
</tr>
<tr>
<td>18:30 - 18:45</td>
<td><strong>Hydrocracking of a plastic mixture over various micro-mesoporous composite zeolites</strong></td>
<td>Dureem Munir, University of the Punjab Lahore, Pakistan</td>
<td>Pakistan</td>
<td></td>
</tr>
</tbody>
</table>
Thursday, May 26, 2016 (continued)

18:45 - 19:00  **Performance prediction of riser termination devices using barracuda**
Madhusudhan Kodam, The Dow Chemical Company, USA

**Fluidization of Irregular Shape Particles**

17:00 - 17:15  **Attrition of methanol to olefins catalyst in a jet cup**
Jingai Hao, Chinese Academy of Sciences, China

17:15 - 17:30  **Improved gas-solid mixing and mass transfer in a pulsed fluidized bed of biomass with tapered bottom**
Dening Jia, University of British Columbia, Canada

17:30 - 17:45  **Fluidization of graphene nanoplatelets for Atomic Layer Deposition**
Samir Salameh, Delft University of Technology, the Netherlands

17:45 - 18:00  **Fluidization of irregular particles - Part I: A discrete element method to model collisions between non-convex particles**
Andriarimina Daniel Rakotonirina, IFP Energies Nouvelles, France

18:00 - 18:15  **Three-dimensional modeling of biomass fuel flow in a circulating fluidized bed furnace with an experimentally derived drag force model**
Jouni Ritvanen, Lappeenranta University of Technology, Finland

18:15 - 18:30  **Fluidization of irregular particles - Part II: A Particle-Resolved Simulation method to model hydrodynamic interactions**
Andriarimina Daniel Rakotonirina, IFP Energies Nouvelles, France

18:30 - 18:45  **Simulation of fuel particles motion in a 2D Fluidized Bed using a hybrid-model considering wall friction**
Luis Miguel Garcia-Gutierrez, University Carlos III of Madrid, Spain

18:45 - 19:00  **Study of spouted bed dynamics using spherical and cubic particles in DEM-CFD simulations**
Ali Zaidi, ETH Zurich, Switzerland

19:00 - 20:30  Dinner

20:30 - 22:30  Poster Session and Social
Friday, May 27, 2016

06:30 - 08:00  Breakfast and Departure