

13th International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engineering (GLS-13)

The Crowne Plaza Brussels – Le Palace, Belgium - 20-23 August 2017

Colour legend:

Palace Ballroom (ground floor)
Creativity&Exploration Room (first floor)
Evasion&Innovation Room (first floor)
Harmony Room (first floor)
Mosaic Room // Stoclet Room (posters, lunches, coffee Breaks)
Palace Lobby (posters, lunches, coffee Breaks)

CES paper: full paper available in the Chemical Engineering Science (CES) special issue of October 2017 (the titles in the programme are the titles of the full papers in CES).

Sunday 20 August

17:00 – 19:00: Registration and refreshments

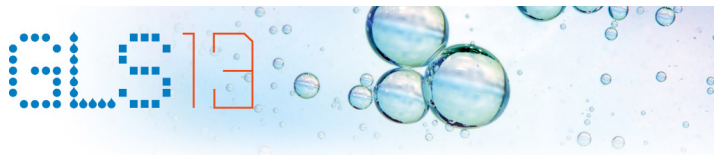
Monday 21 August

08:00 – 18:00: Registration and refreshments

08:30 - 09:30: **Welcome word and Plenary lecture**

Agitation, mixing and transfers induced by a dispersed phase

Prof. Frédéric Risso, Professor at IMF Toulouse, France



09:30 – 18:00: POSTER SESSION

Posters will be exhibited all day. During coffee breaks and during the time slot 17:00-18:00, authors should be near their poster for presentation.

09:30 – 17:40 max: 4 parallel sessions

Session 11a: Physical chemistry of CO₂ capture

Chairmen: T. Supap and D. Thomas

09:30 – 10:00: **Keynote:** (paper 39) Analysis of CO₂ solubility and absorption heat into 1-Dimethylamino-2-propanol solution, Raphael Idem, University of Regina, Canada – **CES paper**

10:00 – 10:20: (paper 49) Reaction kinetics of the absorption of carbon dioxide (CO₂) in aqueous solutions of sterically hindered secondary alkanolamines using the stopped-flow techniques, Zhiwu Liang, Hunan University, China – **CES paper**

10:20 – 10:40: (paper 104) Equilibrium solubility and enthalpy of CO₂ absorption in aqueous Bis (3-aminopropyl) amine and its mixture with MEA, MDEA, AMP and K₂CO₃, Amar Nath Samanta, Indian Institute of Technology Kharagpur, India – **CES paper**

10:40 – 11:10: Coffee Break

11:10 – 11:30: (paper 37) Evaluation of the Heat Duty of Catalyst-Aided Amine-Based Post Combustion CO₂ Capture, Raphael Idem, University of Regina, Canada – **CES paper**

11:30 – 11:50: (paper 114) Valorization of CO₂ with epoxides: Influence of gas/liquid mass transfer on reaction kinetics, Alain Ledoux, INSA Rouen, France – **CES paper**

11:50 – 12:10: (paper 87) Kinetics of reaction between CO₂ and ionic liquid-carbon dioxide binding organic liquid hybrid systems: Analysis of gas-liquid absorption and stopped flow experiments, Ozge Yuksel Orhan, Hacettepe University, Turkey – **CES paper**

12:10 – 12:30: (paper 38) Heat Duty, Heat of Absorption, Sensible Heat and Heat of Vaporization of 2-Amino-2-Methyl-1-Propanol (AMP), Piperazine (PZ) and Monoethanolamine (MEA) Tri - Solvent Blend for Carbon Dioxide (CO₂) Capture, Raphael Idem, University of Regina, Canada – **CES paper**

12:30 – 14:00: LUNCH

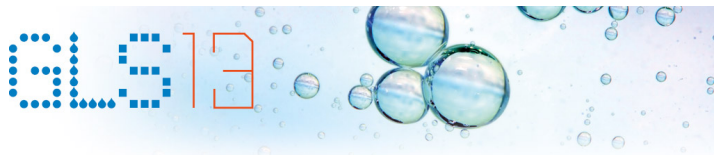
Session 11b: Bubbles

Chairmen: A. Liné and F. Pigeonneau

14:00 – 14:30: **Keynote:** (paper 255) DNS with an embedded mass boundary layer approach for mass transfer from gas bubbles at moderate Reynolds numbers, Shafiul Islam, Eindhoven University of Technology, The Netherlands

14:30 – 14:50: (paper 108) Bubble rising in a 2D packed-cell: Mass transfer quantification, Abderrahmane Kherbeche, INSA Toulouse, France

14:50 – 15:10: (paper 271) High-resolution data on the bubble formation from needles with and without liquid co-flow, Corné Muilwijk, University of Limerick, Ireland



15:10 – 15:40: Coffee Break

15:40 – 16:00: (paper 248) Numerical simulation of bubble formation at a submerged orifice, Haryo Mirsandj, Eindhoven University of Technology, The Netherlands

16:00 – 16:20: (paper 99) Visualization of mass transfer around rising bubble in non-Newtonian fluids, Feishi Xu, INSA Toulouse, France

16:20 – 16:40: (paper 233) Dual emission LIF technique to measure pH field around a rising bubble, Gaopan Kong, Eindhoven University of Technology, The Netherlands

16:40 – 17:00: (paper 296) Unraveling the lifetime dispersion of antibubbles, Youen Vitry, Université libre de Bruxelles, Belgium

17:00 – 17:20: (paper 23) On modulation of isotropic turbulent flow owing to single bubble rise, Geoffrey Evans, University of Newcastle, Australia

Session 21a: Bubble columns

Chairmen: R. Mudde and A. Schumpe

09:30 – 10:00: **Keynote:** (paper 46) Determination of the Entropy Radial Minimum and the Various Transition Velocities in an Air-Water Bubble Column, Stoyan Nedeltchev, Helmholtz-Zentrum Dresden-Rossendorf, Germany – **CES paper**

10:00 – 10:20: (paper 58) A mesoscale approach for population balance modeling of bubble size distribution in bubble column reactors, Ning Yang, Chinese Academy of Sciences, China – **CES paper**

10:20 – 10:40: (paper 86) Simulation and Experimental Validation of Reactive Bubble Column Reactors, Mark W. Hlawitschka, TU Kaiserslautern, Germany – **CES paper**

10:40 – 11:10: Coffee Break

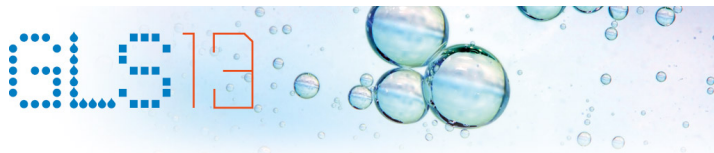
11:10 – 11:30: (paper 133) Numerical simulation of the bubble column at elevated pressure with a CFD-PBM coupled model, Tiefeng Wang, Tsinghua University, China – **CES paper**

11:30 – 11:50: (paper 142) On the Experimental Investigation of Gas-Liquid Flow in Bubble Columns using Ultrafast X-ray Tomography and Radioactive Particle Tracking, Salar Azizi, Helmholtz-Zentrum Dresden-Rossendorf, Germany – **CES paper**

11:50 – 12:10: (paper 152) Particle agglomeration studies in a slurry bubble column due to liquid bridging: Effects of particle size and sparger design, Dominic Pjontek, The University of Western Ontario, Canada – **CES paper**

12:10 – 12:30: (paper 6) Extraction of Information and Reconstruction Entropies from Ultrafast X-ray Tomography Data in a Bubble Column, Stoyan Nedeltchev, Helmholtz-Zentrum Dresden-Rossendorf, Germany – **CES paper**

12:30 – 14:00: LUNCH



Session 21b: Bubble columns

Chairmen: A.M. Billet and S. Nedeltchev

14:00 – 14:30: **Keynote:** (paper 139) Flow regime transitions in a bubble column, Adrian Schumpe, TU Braunschweig, Germany – **CES paper**

14:30 – 14:50: (paper 157) Investigations of flow structure and liquid mixing in bubble column equipped with selected internals, Anand Prakash, The University of Western Ontario, Canada – **CES paper**

14:50 – 15:10: (paper 26) Study of hydrodynamics and mixing induced by bubble swarms in highly viscous fluids, David Laupsien, INSA Toulouse, France

15:10 – 15:40: Coffee Break

15:40 – 16:00: (paper 85) Developing Comprehensive Correlations for Predicting Gas Holdup in Bubble Column Reactors Operating with Viscous Liquids at High-Pressure/High-Temperature Conditions, Amin Esmaeili, Polytechnique Montréal, Canada

16:00 – 16:20: (paper 71) Displacement flows in periodically moving pipe: understanding multiphase flows hosted in oscillating geometry, Faiçal Larachi, Laval University, Canada – **CES paper**

16:20 – 16:40: (paper 224) Influence of the bubble size distribution on bubble column stability, Dirk Lucas, Helmholtz-Zentrum Dresden-Rossendorf, Germany

16:40 – 17:00: (paper 226) Euler-Euler Modeling of Reactive Bubbly Flows, Roland Rzehak, Helmholtz-Zentrum Dresden-Rossendorf, Germany

17:00 – 17:20: (paper 241) The effect of solid loading on local gas holdup in pilot scale bubble column with industrial heat exchanger internals structure, Muthanna Al-Dahhan, Missouri S&T, USA

17:20 – 17:40: (paper 289) Interrelation of the hydrodynamics and species conversion during chemical absorption of CO₂, Ragna Kipping, TU Dresden, Germany

Session 31a: Industrial applications of GL and GLS reactors

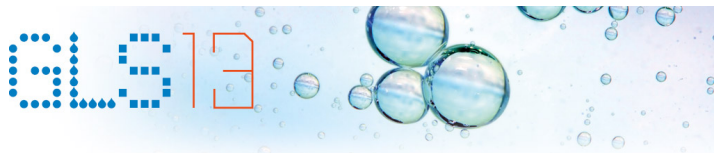
Chairmen: N. Nikacevic and V.C. Sivastrava

09:30 – 10:00: **Keynote:** Industrial use and development of flow/microreactors for multiphase applications, Dominique Roberge, Lonza, Switzerland

10:00 – 10:20: (paper 101) Hydrodynamics of Gas-Liquid Cocurrent Upflow in Oscillating Packed Beds for Offshore Marine Applications, Faiçal Larachi, Laval University, Canada – **CES paper**

10:20 – 10:40: (paper 143) Studies of a downflow bubble column: experimental investigations, Jyeshtharaj B. Joshi, Homi Bhabha National Institute, India

10:40 – 11:10: Coffee Break



11:10 – 11:30: (paper 297) Numerical modelling of subcooled flow boiling of R-134a inside a horizontal annular pipe using a mechanistic approach in OpenFOAM, Mohsen Ariana, University of Sherbrooke, Canada

11:30 – 11:50: (paper 290) Intensification of continuous hydrothermal synthesis/ treatment of inorganic particles, Philippe Eliaers, CERTECH, Belgium

11:50 – 12:10: (paper 250) Influence of process parameters on heat generation and removal in fixed bed reactors for Fischer-Tropsch synthesis, Branislav Todic, Texas A&M University at Qatar, Qatar

12:10 – 12:30: (paper 61), Hybrid electrocoagulation/electroflotation/electrodisinfection process as a pretreatment by seawater desalination, Jean Nepo Hakiziman, Hassan II University, Morocco – **CES paper**

12:30 – 14:00: LUNCH

Session 31b: CO₂ capture and purification processes

Chairmen: A. Ledoux and D. Thomas

14:00 – 14:30: **Keynote:** Environmental impact assessment of Post-Combustion amine-based CO₂ Capture technology, Hélène Lepaumier, ENGIE Laborelec, Belgium

14:30 – 14:50: (paper 34) Selection of components for formulation of amine blends for post combustion CO₂ capture based on the side chain structure of primary, secondary and tertiary amines, Raphael Idem, University of Regina, Canada – **CES paper**

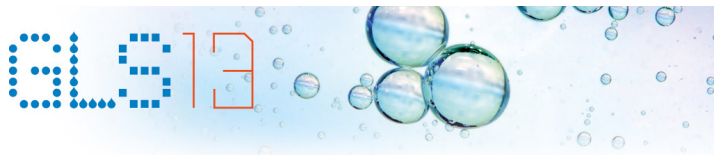
14:50 – 15:10: (paper 42) Screening tests of aqueous alkanolamine solutions based on primary, secondary, and tertiary structure for blended aqueous amine solution selection in post combustion CO₂ capture, Teeradet Supap, University of Regina, Canada – **CES paper**

15:10 – 15:40: Coffee Break

15:40 – 16:00: (paper 38bis) A flexible and robust model for low temperature catalytic desorption of CO₂ from CO₂-loaded amines over solid acid catalysts, Raphael Idem, University of Regina, Canada – **CES paper**

16:00 – 16:20: (paper 246) Parametric study of the Sour Compression Unit (SCU) process for CO₂ purification applied to flue gases coming from oxy-combustion cement industries, Sinda Laribi, University of Mons, Belgium

16:20 – 16:40: (paper 35) Mass transfer studies on catalyst-aided CO₂ desorption from CO₂-loaded amine solution in a post-combustion CO₂ capture plant, Raphael Idem, University of Regina, Canada – **CES paper**



Session 41a: Devices

Chairmen: J.M. Buchlin and V. Kumar

09:30 – 10:00: **Keynote:** (paper 231) Hybrid TFM-DPM application in CFD Simulation of Liquid-Liquid Emulsions Drop Size Distribution in Stirred Tank Reactors, Reza Farzad, Johannes Kepler University – Linz, Austria

10:00 – 10:20: (paper 129) Comparative analysis of liquid hydrodynamics in a co-current flow-through bubble column with densely packed internals via radiotracing and Radioactive Particle Tracking (RPT), Shantanu Roy, Indian Institute of Technology Delhi, India – **CES paper**

10:20 – 10:40: (paper 268) Characterisation of gas dispersion in filtration modules of a membrane bioreactor using electrical resistivity tomography, Elodie Suard, Irstea, France

10:40 – 11:10: Coffee Break

11:10 – 11:30: (paper 10) Volumetric mass transfer coefficient in viscous liquid in mechanically agitated fermenters - Measurement and correlation, Radim Petricek, Prague University of Chemistry and Technology, Czech Republic – **CES paper**

11:30 – 11:50: (paper 94) Power consumption and mass transfer in a gas-liquid-solid stirred tank reactor with various triple-impeller combinations, Yuyun Bao, Beijing University of Chemical Technology, China – **CES paper**

11:50 – 12:10: (paper 45) Investigating the effects of the scales of mixing on mass transfer through the free-surface in stirred tank bioreactors, Anne de Lamotte, University of Liège, Belgium

12:10 – 12:30: (paper 249) A Coupled IBM-VOF Method to Simulate 3D Multiphase Flows Through Complex Solid Geometries, Harshil V. Patel, Eindhoven University of Technology, The Netherlands

12:30 – 14:00: LUNCH

Session 41b: Industrial applications of GL and GLS reactors

Chairmen: Arturo Macchi and D. Toye

14:00 – 14:30: **Keynote:** (paper 213) Comprehensive process simulation of a 525 MWth petcoke CLC power plant, Odile Vekemans, Université libre de Bruxelles, Belgium

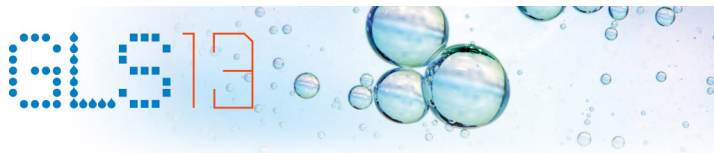
14:30 – 14:50: (paper 236) Fischer-Tropsch synthesis in conventional and milli-fixed-bed reactors: a modeling study, Nikola Nikacevic, University of Belgrade, Serbia

14:50 – 15:10: (paper 201) Reactive multiphase CFD study of chemical looping combustion in a double looping fluidized bed reactor, Yuanwei Zhang, NTNU – Trondheim, Norway

15:10 – 15:40: Coffee Break

15:40 – 16:00: (paper 76) Kinetic Study of Nitrogen doped Carbon Nanotube in a Fixed Bed, Anita Gopalkrishna Sharma, Institute of Chemical Technology Matunga, India – **CES paper**

16:00 – 16:20: (paper 80) A novel CFD-XDEM model for predicting liquid flow in dripping zone of blast furnace, Maryam Baniyadi, Université du Luxembourg, Luxembourg



16:20 – 16:40: (paper 259) Analysis of Airlift Photobioreactor via Computed Tomography CT and Radioactive Tracking Techniques, Muthanna Al-Dahhan, Missouri S&T, USA

16:40 – 17:00: (paper 702) Transient model of a fluorine electrolysis cell coupling electric currents, heat transfer, two-phase flow and transport of species, Julien Vukasin, Université de Montpellier, France

17:00 – 17:20: (paper 130) Investigation of two-phase (oil-water) flow in coiled geometries using "Radioactive Particle Tracking - Time of Flight (RPT-TOF)" and "Radioactive Particle Tracking - Volume Fraction (RPT-VOF)" measurements, Shantanu Roy, Indian Institute of Technology Delhi, India – **CES paper**

17:20 – 17:40: (paper 136) Kinetic modeling for catalytic cracking of pyrolysis oils with VGO in a FCC unit, Vimal Kumar, Indian Institute of Technology Roorkee, India – **CES paper**



Tuesday 22 August

08:00 – 18:00: Registration and refreshments

08:30 - 09:30: Plenary lecture

Evaluating large-scale robustness of bioprocesses: combining PAT and scale-down bioreactors

Prof. Peter Neubauer, *Chair of bioprocess engineering at TU Berlin, Germany*

09:30 – 18:00: POSTER SESSION

Posters will be exhibited all day. During coffee breaks and during the time slot 17:00-18:00, authors should be near their poster for presentation.

09:30 - 17:20 max: 3 parallel sessions

Session 12a: Bubbles, drops and films

Chairmen: M.W. Baltussen and Benoit Scheid

09:30 – 10:00: **Keynote:** Bubble dynamics occurring during the glass melting process, Franch Pigeonneau, Mines - ParisTech, France

10:00 – 10:20: (paper 2) Experimental investigation into the drag volume fraction correction term for gas-liquid bubbly flows, Dale McClure, The University of Sydney, Australia – **CES paper**

10:20 – 10:40: (paper 9) Interactions in droplet and particle system of near unity size ratio, Subhasish Mitra, University of Newcastle, Australia – **CES paper**

10:40 – 11:10: Coffee Break

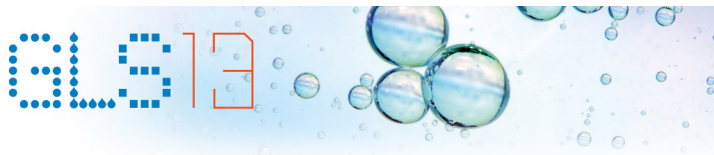
11:10 – 11:30: (paper 20) Bubble pinch-off in Newtonian and non-Newtonian fluids, Huai Z. Li, ENSIC, France – **CES paper**

11:30 – 11:50: (paper 65) On nature of mass transfer near liquid-liquid interface in the presence of Marangoni instabilities, Jyeshtharaj Joshi, Homi Bhabha National Institute, India – **CES paper**

11:50 – 12:10: (paper 73) Discussion about the differences in mass transfer, bubble motion and surrounding liquid motion between a contaminated system and a clean system based on consideration of three-dimensional wake structure obtained from LIF visualization, Jie Huang, Shizuoka University, Japan – **CES paper**

12:10 – 12:30: (paper 149) Low Kapitza Falling Liquid Films, Miguel Alfonso Mendez, Von Karman Institute, Belgium – **CES paper**

12:30 – 14:00: LUNCH



Session 12b: Bubbles, drops and films

Chairmen: A. Cockx and Frédéric Risso

14:00 – 14:30: **Keynote:** (paper 260) Cutting bubbles with a wire mesh, Maïke W. Baltussen, Eindhoven University of Technology, The Netherlands

14:30 – 14:50: (paper 132) Impact of buoyancy and vapor/liquid equilibrium on spherical gas bubble dissolution in microchannels, Javier Rivero, Université libre de Bruxelles, Belgium

14:50 – 15:10: (paper 96) Visualization and characterization gas-liquid mass transfer around Taylor bubbles flowing in meandering millimetric reactors, Nicolas Dietrich, INSA Toulouse, France

15:10 – 15:40: Coffee Break

15:40 – 16:00: (paper 206) Comparative study of a spray with optical probe and high-speed camera, Kritchart Wongwailikhit, INSA Toulouse, France

16:00 – 16:20: (paper 214) Numerical method for insoluble surfactant transport and Marangoni effect – application to bubble rising in stagnant infinite liquids and in microchannels, Omer Atasi, Université libre de Bruxelles, Belgium

16:20 – 16:40: (paper 225) Gas-liquid exchanges in the human lungs – analogy with Chemical Engineering, Cyril Karamaoun, Université libre de Bruxelles, Belgium

16:40 – 17:00: (paper 272) CFD study on alternating droplet generation for liquid-liquid microreactor application, Arnab Atta, Indian Institute of Technology Kharagpur, India

17:00 – 17:20: (paper 251) Coupling of the Local Front Reconstruction Method with a Film Drainage Model, Adnan H. Rajkotwala, Eindhoven University of Technology, The Netherlands

Session 22a: Packed beds and trickle beds

Chairmen: F. Larachi and D. Toye

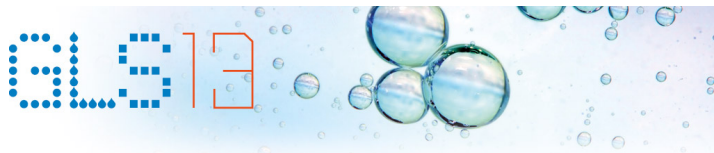
09:30 – 10:00: **Keynote:** (paper 72) Investigation of effective interfacial area in a rotating packed bed with structured stainless steel wire mesh packing, Yong Luo, Beijing University of Chemical Technology, China – **CES paper**

10:00 – 10:20: (paper 21) Advanced Understanding of Local Wetting Behaviour in Gas - liquid - solid Packed Beds Using CFD with a Volume of Fluid (VOF) Method, Guangxiang He, China University of Petroleum, China – **CES paper**

10:20 – 10:40: (paper 98) Measurements of Local Liquid Volume Fraction Distribution and Flow Structures in a Trickle Bed using Electrical Resistance Tomography and Voidage Probes, Ekta Jain, Indian Institute of Technology Delhi, India

10:40 – 11:10: Coffee Break

11:10 – 11:30: (paper 270) Experimental and CFD Analysis of Particle-Scale Flow and RTD in Packed Beds, Vivek V. Buwa, Indian Institute of Technology Delhi, India



11:30 – 11:50: (paper 253) CFD analysis of liquid distribution in periodically operated packed bed reactors, Soumendu Dasgupta, Indian Institute of Technology Kharagpur, India

11:50 – 12:10: 3D numerical simulation of a rotating packed bed with structured stainless steel wire mesh packing, Yi Liu, Beijing University of Chemical Technology, China – **CES paper**

12:10 – 12:30: (paper 205) Local Liquid Distribution in Trickle Beds: ERT Measurements and CFD Simulations, Vivek Buwa, Indian Institute of Technology Delhi, India

12:30 – 14:00: LUNCH

Session 22b: Bubble columns and fluidized beds

Chairmen: J. Joshi and T. Wang

14:00 – 14:30: **Keynote:** (paper 228) Local Hydrodynamics, Mixing and Mass Transfer in Bubble Columns with Internals, Felix Moeller, Helmholtz-Zentrum Dresden-Rossendorf, Germany

14:30 – 14:50: (paper 221) Global hydrodynamics and gas-liquid transfer for various fluids in a thin-gap bubble column, Charlène Thobie, Laboratoire GEPEA, France

14:50 – 15:10: (paper 269) X-ray techniques to study hydrodynamics of dense bubbly flows in airlift bubble column, Manas M. Mandalahalli, Delft University of Technology, The Netherlands

15:10 – 15:40: Coffee Break

15:40 – 16:00: (paper 62) Settling/rising of a foreign particle in solid-liquid fluidized beds: Application of dynamic mesh technique, Geoffrey Evans, University of Newcastle, Australia – **CES paper**

16:00 – 16:20: (paper 267) Characterization of Dynamics of Unary and Binary Gas-solid Flow in a Cylindrical Fluidized Bed using Electrical Capacitance Tomography, Brajesh K. Singh, Indian Institute of Technology Delhi, India

16:20 – 16:40: (paper 3) Impact of catalyst density distribution on the fluid dynamics of an ebullated bed operating at high gas holdup conditions, Arturo Macchi, University of Ottawa, Canada – **CES paper**

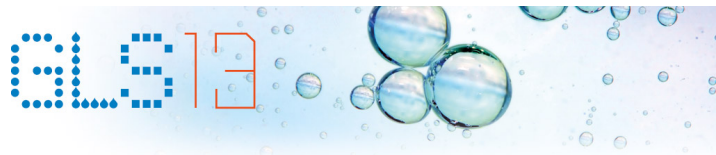
16:40 – 17:00: (paper 28) Horizontal Immersed Heater-to-Bed Heat Transfer with Layer Inversion in Gas-Liquid-Solid Fluidized Beds of Binary Solids, Dong Hyun Lee, Sungkyunkwan University, Republic of Korea – **CES paper**

17:00 – 17:20: (paper 222) Flow regime transition in a high pressure fluidized bed, Ying Han, Beijing Research Institute of Petroleum Processing, China

Session 32a: Bioreactors, bioresource engineering and water treatment

Chairmen: F. Debaste and J. Texeira

09:30 – 10:00: **Keynote:** Biochemical engineering's grand adventure, Henk Noorman, DSM, The Netherlands – **CES paper**



10:00 – 10:20: (paper 27) Euler-Lagrange analysis towards representative down-scaling of a 22 m³ aerobic *S. cerevisiae* fermentation, Cees Haringa, TU Delft, The Netherlands

10:20 – 10:40: (paper 115) Influence of liquid phase hydrodynamics on biofilm formation on structured packing: Optimisation of surfactin production from *Bacillus amyloliquefaciens*, Frank Delvigne, University of Liège, Belgium – **CES paper**

10:40 – 11:10: Coffee Break

11:10 – 11:30: (paper 135) A new bioreactor design for culturing basidiomycetes: mycelial biomass production in submerged cultures of *Ceriporiopsis subvermispota*, Arnaldo Marcio Ramalho Prata, University of São Paulo, Brazil – **CES paper**

11:30 – 11:50: (paper 138) Mixing and liquid-to-gas mass transfer under digester operating conditions, Christophe Vial, Université Clermont Auvergne, France – **CES paper**

11:50 – 12:10: (paper 148) Enhanced Oxygen Delivery to a Multiphase Continuous Bioreactor, Thomas R. Hanley, Auburn University, USA – **CES paper**

12:10 – 12:30: (paper 18) Study of spray absorption for food aroma recovery, Frédéric Debaste, Université Libre de Bruxelles (Belgium)

12:30 – 14:00: LUNCH

Session 32b: Bioreactors, bioresource engineering and water treatment

Chairmen: F. Delvigne and H. Noorman

14:00 – 14:30: **Keynote:** (paper 277) Solid-Liquid and Gas-Liquid Mass Transfer of PAHs in Soil-Slurry Bioreactors, Douglas O. Pino-Herrera, Université Paris-Est, France

14:30 – 14:50: (paper 79) Modeling and design of a process for estrogenicity removal by immobilized laccases in a packed-bed reactor, Rosalie Pype, Université libre de Bruxelles (Belgium)

14:50 – 15:10: (paper 14) The Role of Gas/Liquid Contacting in Water/Wastewater Ozonation, Adam Donaldson, Dalhousie University, Canada

15:10 – 15:40: Coffee Break

15:40 – 16:00: (paper 212) Novel External Loop Inverse Fluidized Bed Airlift for Biochemical Reactors, Iman Mohammed, TU Dresden, Germany

16:00 – 16:20: (paper 81) Assessing moment methods for the simulation of population dynamics in large-scale bioreactors, Maxime Pigou, INSA Toulouse, France

16:20 – 16:40: (paper 146) Oxygen transfer in activated sludge reactors: Comparative impact of the non-Newtonian behaviour on fine and coarse bubble performances, Yannick Fayolle, Irstea, France

16:40 – 17:00: (paper 208) Hydrodynamic analysis of gas-liquid flow in a novel bioreactor equipped with the coaxial mixer through tomography and CFD, Farhad Ein-Mozaffari, Ryerson University, Canada



Wednesday 23 august

08:00 – 12:00: Registration and refreshments

08:30 - 09:30: **Conclusion and Plenary lecture**

Multiphase flow visualization and measurement via radiation-based computed tomography methods

Prof. Uwe Hampel, *AREVA Endowed Professor at TU Dresden, Germany*

09:30 – 12:00: POSTER SESSION

Posters will be exhibited the entire half-day. During coffee breaks, authors should be near their poster for presentation.

09:30 - 12:30: 3 parallel sessions

Session 13: Fundamental principles

Chairmen: G. Evans and H. Van Den Akker

09:30 – 10:00: **Keynote:** (paper 82) Experimental characterization of multi-component absorption in complex liquid: new method and apparatus, Gilles Hébrard, INSA Toulouse, France – **CES paper**

10:00 – 10:20: (paper 24) The relationship between bubble motion and particle flocculation pattern under 20-kHz-ultrasound radiation in water, Hiroya Muramatsu, Shizuoka University, Japan – **CES paper**

10:20 – 10:40: (paper 274) Mass transfer during a gas dissolution process around a stationary single microbubble, Tomoaki shigehisa, Keio University, Japan

10:40 – 11:10: Coffee Break

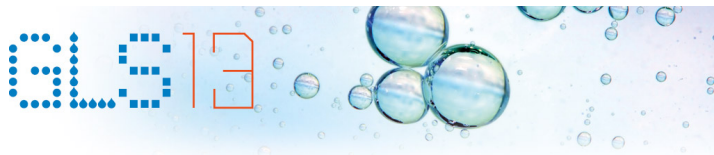
11:10 – 11:30: (paper 16) Investigation of drag force corrections for bubble column simulations with CFD-PBM under the heterogeneous regime, Luca Gemello, IFP Energies Nouvelles, France

11:30 – 11:50: (paper 105) Fast determination of gas-liquid diffusion coefficient by an innovative double approach, Feishi Xu, INSA Toulouse, France – **CES paper**

11:50 – 12:10: (paper 258) Mass transfer from a fast shrinking microbubble containing N₂ and/or O₂ into water, Shunya Tanaka, Keio University, Japan

12:10 – 12:30: (paper 74) A hydrophobic wire mesh for better liquid splashing in air, Yong Luo, Beijing University of Chemical Technology, China – **CES paper**

12:30 – 14:00: LUNCH



Session 23: Innovative devices for GL and GLS reactors

Chairmen: D. Roberge and O. Vekemans

09:30 – 10:00: **Keynote:** (paper 161) Gas-liquid absorption in industrial cross-flow membrane contactors: experimental and numerical investigation of the influence of transmembrane pressure on partial wetting, Valentin Fougerit, CentraleSupélec, France – **CES paper**

10:00 – 10:20: (paper 64) Oscillations induced by bubble flow in a horizontal cylindrical vessel, Yugo Kanai, University of Fukuoka, Japan – **CES paper**

10:20 – 10:40: (paper 84) Effect of solids on O₂ mass transfer in an oscillatory flow reactor provided with smooth periodic constrictions, António M A Ferreira, Universidade do Porto, Portugal – **CES paper**

10:40 – 11:10: Coffee Break

11:10 – 11:30: (paper 122) Measurement and Simulation of Mass Transfer and Backmixing Behavior in a Gas-Liquid Helically Coiled Tubular Reactor, Michael Jokiel, Max Planck Institute for Dynamics of Complex Technical Systems, Germany – **CES paper**

11:30 – 11:50: (paper 301) Continuous separation, with microfluidics, of H₂O and H₂O₂: from vacuum to purge gas pervaporation, Alexandra Buess, Université libre de Bruxelles, Belgium

11:50 – 12:10: (paper 202) Ultrasound effects on gas-liquid and solid-liquid flows in microreactors, Zhengya Dong, KU Leuven, Belgium

12:10 – 12:30: (paper 232) Experimental study on the influence of horizontal channel vibration on the mass transfer rate of bubbles in milli-channels, Mohammadreza Haghnegahdar, Helmholtz-Zentrum Dresden-Rossendorf, Germany

12:30 – 14:00: LUNCH

Session 33: Industrial applications of GL and GLS reactors

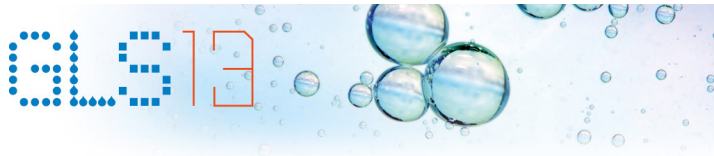
Chairmen: J.M. Buchlin and C. Vial

09:30 – 10:00: **Keynote:** (paper 237) Three-phase alkynes hydrogenation in a structured reactor, Sergio Vernuccio, ETH Zurich, Switzerland

10:00 – 10:20: (paper 4) CFD simulation of the coke combustion in an industrial FCC regenerator, Benjamin Amblard, IFP Energies nouvelles, France – **CES paper**

10:20 – 10:40: (paper 68) A Three-phase Robinson-Mahoney reactor as a tool for intrinsic kinetic measurements: Determination of Gas-liquid hold up and volumetric mass transfer coefficient, Jeroen Lauwaert, Ghent University, Belgium – **CES paper**

10:40 – 11:10: Coffee Break



11:10 – 11:30: (paper 100) Strongly coupled model for the prediction of the performances of an electrochemical reactor, Camila B. Vieira, Sherbrooke University, Canada – **CES paper**

11:30 – 11:50: (paper 54) Rheological properties study of foam fracturing fluid using CO₂ and surfactant, Zhiwu Liang, Hunan University, China – **CES paper**

11:50 – 12:10: (paper 30) Effect of Differential Flow Schemes on Gas-Liquid Flow and Liquid Phase Mixing in a Basic Oxygen Furnace (BOF), Vivek V. Buwa, Indian Institute of Technology Delhi, India – **CES paper**

12:10 – 12:30: (paper 44) Numerical Modeling of Ferrous Iron Oxidation in a Split-Rectangular Airlift Reactor, Christophe Vial, Université Clermont Auvergne, France – **CES paper**

12:30 – 14:00: LUNCH

END OF THE CONFERENCE
