



ITALIAN ASSOCIATION OF INDUSTRIAL PLANT ENGINEERING



ANIMP MULTIPHASE FLOW ENGINEERING SECTION



**UNIVERSITÀ
DEGLI STUDI
DI BRESCIA**

MFIP17

**14th International Conference
on
MULTIPHASE FLOW IN INDUSTRIAL PLANTS**

CONFERENCE PROGRAMME

**Hotel Acquaviva del Garda
Desenzano del Garda (Brescia), Italy
September 13-15, 2017**

Sponsorship



TEASISTEMI
ENERGY AND ENVIRONMENT TECHNOLOGIES

techfem
Human & Sustainable Engineering

Under the patronage of

AIDIC

CONFERENCE PROGRAMME

Wednesday - September 13th, 2017

8.30-9.00	Registration	
9.00-9.30	Opening Ceremony	Ing. Francesco Ferrini – Techfem Prof. Pietro Poesio – Università degli Studi di Brescia Prof. Rodolfo Faglia – Università degli Studi di Brescia Dott. Guido Malinverno – Mayor of Desenzano del Garda (BS)
9.30-11.10	Session 1	Basic Studies in Multiphase Flow
11.10-11.40	Coffee break	
11.40-12.45	Session 2	Fluid Dynamics of Solid-Fluid Suspensions
13.00-14.00	Lunch	
14.00-14.45	Invited lecture	Prof. Neima Brauner - Tel-Aviv University
14.45-15.50	Session 3	1D Modelling for Pipeline Simulations
15.50-16.20	Coffee break	
16.20-18.00	Session 4	Modelling and CFD in Multiphase Systems

Thursday - September 14th, 2017

8.30-9.00	Registration	
9.00-9.45	Invited lecture	Prof. Paolo Andreussi - TEA Sistemi and Università di Pisa
9.45-10.50	Session 5	Basic Studies in Multiphase Flow
10.50-11.20	Coffee break	
11.20-13.00	Session 6	Modelling and CFD in Multiphase Systems
13.00-14.00	Lunch	
14.00-16.00	Session 7	Modelling and CFD in Multiphase Systems
16.00-16.30	Coffee break	
16.30-17.50	Session 8	Experimental Characterization for Oil&Gas Applications
20.00	Social Dinner	

Friday - September 15th, 2017

8.30-9.00	Registration	
9.00-9.45	Invited lecture	Prof. Daniele Marchisio - Politecnico di Torino
9.45-11.10	Session 9	Bubbly Flow
11.10-11.40	Coffee break	
11.40-13.00	Session 10	Phase Change and Heat Transfer in Multiphase Flow Systems
13.00-14.00	Lunch	
14.00-15.40	Session 11	Experimental Measurements and Techniques in Multiphase Flow
15.40-16.00	Closure	

MFIP17

Desenzano del Garda (BS), Sept. 13-15, 2017

Wednesday, 13th a.m.

9.00-9.30 – OPENING CEREMONY

9.30-11.10 - SESSION 1: Basic Studies in Multiphase Flows

COAL PARTICLES AS DISCRETE ELEMENTS: THE ROLE OF COLLISIONS IN ENTRAINED-FLOW
SLAGGING GASIFIERS

Francesco Saverio Marra, Giovanni Tretola, Maurizio Troiano, Fabio Montagnaro, Piero Salatino

THE ANALYSIS OF INFLUENCE OF VARIOUS COMPONENTS OF WETNESS LOSSES ON STEAM
TURBINES STAGES AND COMPARTMENTS EFFICIENCY

Artur Avetisyan

STABILITY OF STRESSED MULTIPLE EMULSIONS PREPARED BY MEMBRANE EMULSIFICATION

Laura Luhede, Alexander Schulz, Udo Fritsching

COUNTERCURRENT FLOW LIMITATION IN VERTICAL PIPES AND NEARLY HORIZONTAL PIPES

Michio Murase, Takashi Kusunoki, Akio Tomiyama

EFFECT OF BREAKUP CONDITIONS IN DOSING OPERATIONS

Carmelina Longo, Gaetano D'Avino, Francesco Greco, Pier Luca Maffettone, Francesco Corominas

11.40-12.45 - SESSION 2: Fluid Dynamics of Solid-Fluid Suspensions

COARSE GRAIN DEM TWO-PHASE MODELLING OF RISER FLOW HYDRODYNAMICS IN GAS-SOLID
POLYMERIZATION REACTOR

Alberto Di Renzo, Nicolò Arich de Finetti, Valerio Cimino, Francesco P. Di Maio

SOLID-LIQUID TRANSPORT IN MULTIPHASE FLOW MIXTURES ANALYSIS – EXPERIMENTAL
INVESTIGATION

*Mariella Leporini, Maurizio Benucci, Giuseppe Di Giovine, Barbara Marchetti, Giancarlo Giacchetta, Fabio Polonara,
Francesco Corvaro, Alessandro Terenzi*

THE EFFECT OF ELECTROSTATIC FORCES ON BUBBLE IN FLUIDIZED BED

Zhen Tan, Cai Liang, Junfei Li, Shuzhao Zhang

Wednesday, 13th p.m.

14.00-14.45 - INVITED LECTURE

NEW INSIGHTS INTO THE MODELING OF STRATIFIED FLOW CHARACTERISTICS
AND STABILITY BOUNDARIES

Neima Brauner

14.45-15.50 - SESSION 3: 1D Modelling for Pipeline Simulations

A SIMPLIFIED, MONO-DIMENSIONAL TWO-FLUID MODEL WITH ARTIFICIAL DIFFUSION FOR SLUG
CAPTURING

Arianna Bonzanini, Davide Picchi, Pietro Poesio

A SLUG CAPTURING METHOD IN UNCONVENTIONAL SCENARIOS: THE 5ESCARGOTS CODE APPLIED
TO NON-NEWTONIAN FLUIDS, HIGH VISCOUS OILS AND COMPLEX GEOMETRIES

Marco Ferrari, Arianna Bonzanini, Pietro Poesio

STRATIFIED GAS-LIQUID FLOW– AN ANALYSIS OF STEADY STATE AND DYNAMIC SIMULATION
FOR GAS-CONDENSATE SYSTEMS

Luigi Raimondi

16.20-18.00 - SESSION 4: Modelling and CFD in Multiphase Systems

NUMERICAL SIMULATION OF CLOGGING IN MICROCHANNELS

Marco Trofa, Gaetano D'Avino, Giovanna Tomaiuolo, Francesco Greco, Pier Luca Maffettone, Stefano Guido

DEM-CFD MODELLING OF THE FT4 POWDER RHEOMETER IN AERATED CONDITIONS

Wenguang Nan, Vincenzino Vivacqua, Mojtaba Ghadiri, Yueshe Wang

CFD-DEM ANALYSIS OF PARTICLE ATTRITION IN A CYCLONE

Fabio Fulchini, Mojtaba Ghadiri, Antonia Borissova, Benjamin Amblard, Stephane Bertholin, Ann Cloupet, Thierry Gauthier, Mahdi Yazdan Panah

CFD SIMULATION OF FLOW AND TRANSPORT IN POROUS MEDIA USING SIMPLIFIED AND REALISTIC
GEOMETRIES

Eleonora Crevacore, Gianluca Boccardo, Rajandrea Sethi, Tiziana Tosco, Daniele Marchisio

ASSESSMENT OF PORE DIFFUSION IN A MICRO-CHANNEL USING AN IMMERSED BOUNDARY METHOD

Ananda Subramani Kannan, Andreas Mark, Fredrik Edelvik, Gaetano Sardina, Srdjan Sasic and Henrik Ström

Thursday, 14th a.m.

9.00-9.45 - INVITED LECTURE

THE EVOLUTION OF MULTIPHASE FLOW SIMULATORS

Paolo Andreussi

9.45-10.50 - SESSION 5: Basic Studies in Multiphase Flows

THE CONCENTRATION PROFILE OF A TWO COMPONENT BED AFTER DEFLUIDIZATION: THE PHASE EQUILIBRIUM ANALOGY

Brunello Formisani, Rossella Girimonte, Vincenzino Vivacqua

MIXTURE MODEL FOR LAMINAR LIQUID-SOLID SLURRY FLOWS

Andrey Gavrilov, Alexander Shebelev

EFFECT OF PIPE DIAMETER ON DRAG REDUCTION BY DEGRADABLE POLYMERS

Marina Campolo, Mattia Simeoni, Cristian Marchioli, Alfredo Soldati

11.20-13.00 - SESSION 6: Modelling and CFD in Multiphase Flow Systems

AEROSOL EVOLUTION AND DEPOSITION IN AN IN VITRO EXPOSURE SYSTEM

Francesco Lucci, Arkadiusz Kuczaj

A ONE-DIMENSIONAL NUMERICAL METHOD FOR THE SIMULATION OF THREE-PHASE FLOWS WITH PHASE CHANGE IN PIPES

Manuel Martínez, Lluís Vazquez, Anton Vernet, Jordi Pallares

CHARACTERISTICS OF NATURAL CIRCULATION IN CLOF ACCIDENT WITH SMART-ITL

Jin-Hwa Yang, Hwang Bae, Sung-Uk Ryu, Byong Guk Jeon, Sung-Jae Yi, Hyun-Sik Park

SLUG CATCHER FINGER-TYPE CFD SIMULATOR FOR TWO-PHASE FLOW SEPARATION

Alessio Pierro, Simone Spadoni, Francesco Chiappetta, Francesco Ferrini

DECOMPRESSION MODELLING OF PIPELINE TRANSPORTING NATURAL GAS USING THE PENG-ROBINSON EQUATION OF STATE

Davide Dall'Acqua, Alessandro Terenzi, Mariella Leporini, Valerio D'Alessandro, Giancarlo Giacchetta, Barbara Marchetti

Thursday, 14th p.m.

14.00-16.00 - SESSION 7: Modelling and CFD in Multiphase Systems

PREDICTION OF BUBBLE SIZE DISTRIBUTIONS IN LARGE-SCALE BUBBLE COLUMNS USING
COMPUTATIONAL FLUID DYNAMICS

Giorgio Besagni, *Fabio Inzoli*, Thomas Ziegenhein, Dirk Lucas

VALIDATION OF A CFD-PBM MODEL FOR THE SIMULATION OF BOILING FLOWS

Antonio Buffo, Marco Vanni, *Daniele Marchisio*, Gustavo Montoya, Emilio Baglietto

THE NATURE OF INSTABILITIES IN BUBBLY FLOWS/ A COMPARISON BETWEEN EULERIAN-EULERIAN
AND EULERIAN-LAGRANGIAN APPROACHES

Gaetano Sardina, Klas Jareteg, Henrik Ström, *Srdjan Sasic*, Christophe Demazière

EFFECTS OF BUBBLE DYNAMICS AND FORCE FORMULATIONS ON BUBBLE COLUMN PREDICTIONS
WITH THE EULER/LAGRANGE APPROACH

Marcelo Muniz, Martin Sommerfeld

SIMULATION OF LIQUID-LIQUID STIRRED TANKS WITH A CFD-PBM APPROACH

Antonio Buffo, Dongyue Li, Wioletta Podgorska, Marco Vanni, *Daniele Marchisio*

CFD-MODEL FOR INDUSTRIAL BUBBLY FLOWS

Dirk Lucas, Roland Rzehak, Thomas Ziegenhein, Eckhard Krepper, Yixiang Liao

16.30-17.50 - SESSION 8: Experimental Characterization for Oil&Gas Applications

INVESTIGATION ON VENTURI AND NOZZLE DEVICES AS VOLUME FLOW METERS FOR TWO-PHASE,
WATER-VERY VISCOUS OIL FLOWS

Luigi P.M. Colombo, Manfredo Guilizzoni, Giorgio M. Sotgia

HIGH EFFICIENCY GAS-LIQUID SEPARATION SYSTEM FOR PUMPED WELLS

L. Enrique Ortiz-Vidal, Marcel C. Barbosa, *Oscar M. H. Rodriguez*

SEPARATION OF WATER-IN-OIL DISPERSIONS THROUGH ELECTROCOALESCENCE

Vincenzino Vivacqua, *Mojtaba Ghadiri*, Aboubakr. M. Abdullah, Ali Hassanpour, Mohammed J. Al-Marri, Barry
Azzopardi, Buddhik Hewakandamby, Bijan Kermani

THE DEVELOPMENT OF AIR/HIGH VISCOSITY OIL SLUG FLOW IN HORIZONTAL SMALL DIAMETER
PIPES

Gianluca Losi, Pietro Poesio

Friday, 15th a.m.

9.00-9.45 - INVITED LECTURE

SIMULATION OF POLYDISPERSE MULTIPHASE FLOWS WITH MULTI-SCALE STRATEGIES:
FROM ATOMISTIC TO CONTINUUM MODELLING

Daniele Marchisio

9.45-11.10 - SESSION 9: Bubbly flow

ON THE SCALE-UP CRITERIA FOR BUBBLE COLUMNS

Giorgio Besagni, Lorenzo Gallazzini, *Fabio Inzoli*

OXYGEN TRANSFER AND GAS HOLD-UP OF AN AERATION TANK

Kazue Shibata, Noriaki Osawa, Koichi Terasaka, Satoko Fujioka, Keisuke Sudo

CONTRIBUTION OF OXYGEN ABSORPTION FROM FREE SURFACE IN AERATION TANK

Keisuke Sudo, Satoko Fujioka, Koichi Terasaka, Kazue Shibata

INFLUENCE OF FLUID FLOW AND LIGHT DISTRIBUTION ON SINGLE CELLS IN A BUBBLE COLUMN
PHOTOBIOREACTOR

Giovanni Luzi, Christopher McHardy, Jose Rodriguez Agudo, Antonio Delgado, Cornelia Rauh

11.40-13.00 - SESSION 10: Phase Change and Heat Transfer in Multiphase Systems

HEAT TRANSFER DEGRADATION DURING VAPORIZATION OF NON-AZEOTROPIC MIXTURES

Stefano Bortolin, *Marco Azzolin*, Davide Del Col

PIPELINE WAX DEPOSITION MODELING: A SENSITIVITY STUDY ON TWO COMMERCIAL SOFTWARE

Giancarlo Giacchetta, Barbara Marchetti, Mariella Leporini, Alessandro Terenzi, Davide Dall'Acqua, *Laura Capece*,
Roberta Cocci Grifoni

PACKED-BED REACTOR CHARACTERIZATION OF STEAM-REGENERATED SOLVENT ADSORBERS FOR
RAW-GAS CLEANING

Adam Jareteg, Mikael Israelsson, Srdjan Sasic, Henrik Thunman, Henrik Ström

VISUALIZATION STUDY OF CAPILLARY INDUCED FLOW AND CRITICAL HEAT FLUX ON MICRO-
TEXTURED SURFACES WITH SYNCHROTRON X-RAY IMAGING

Dong In Yu, *Ho Jae Kwak*, Hyunwoo Noh, Hyun Sun Park, Moo Hwan Kim

Friday, 15th p.m.

14.00-15.40 - SESSION 11: Experimental Measurements and Techniques in Multiphase Flow

INFLUENCE OF OIL VISCOSITY ON OIL-WATER CORE-ANNULAR FLOW THROUGH A HORIZONTAL PIPE

Erik van Duin, *Ruud Henkes*, Gijs Ooms

GAS HOLD-UP DISTRIBUTION IN STIRRED TANK EQUIPPED WITH UP- AND DOWN-PUMPING PITCHED BLADE TURBINES VIA ELECTRICAL RESISTANCE TOMOGRAPHY

Antonio Busciglio, Giuseppina Montante, *Alessandro Paglianti*

NUMERICAL AND EXPERIMENTAL STUDIES OF PARTICLE EROSION IN VIEW OF CONSIDERING TEMPORAL SURFACE VARIATION

Guilherme Antônio Novelletto Ricardo, Martin Sommerfeld

THE CA-LOOPING PROCESS, AN ANCIENT TECHNOLOGY FOR NEW CHALLENGES: CO₂ CAPTURE AND THERMOCHEMICAL ENERGY STORAGE

Jose Manuel Valverde

THE CONCEPT OF MINIMUM FLUIDIZATION VELOCITY FOR BINARY-SOLID LIQUID BEDS

Renzo Di Felice

MFIP17

Desenzano del Garda (BS), Sept. 13-15, 2017

SCIENTIFIC COMMITTEE

Barry Azzopardi (University of Nottingham, UK)
Antonio Bennardo (ENI, IT)
Gian Piero Celata (Enea Casaccia, IT)
Renzo Di Felice (Università di Genova, IT)
Alberto Di Lullo (ENI E&P Division)
Alberto Di Renzo (Università della Calabria, IT)
Dario Ercolani (ILF, Monaco - DE)
Brunello Formisani (Università della Calabria, IT)
Francesco Ferrini (Techfem, IT)
Mojtaba Ghadiri (University of Leeds, UK)
Paola Lettieri (University College London, UK)
Antonio Marzocchella (Università di Napoli, IT)
Alessandro Paglianti (Università di Bologna, IT)
Pietro Poesio (Università di Brescia, IT)
Luigi Raimondi (XPsim, IT)
Piero Salatino (Università di Napoli, IT)
Libero Sesti Osseo (Università di Salerno, IT)
Matteo Sironi (Flowserve, IT)
Alfredo Soldati (Università di Udine, IT)
Martin Sommerfeld (Martin-Luther Universität Halle, Wittenberg, DE)
Alessandro Terenzi (Saipem SpA, B.U. Onshore, IT)
Jose Manuel Valverde Millan (Universidad de Sevilla, ES)

ORGANIZING COMMITTEE

Pietro Poesio (Università di Brescia)
Francesco Ferrini (Techfem, Fano)
Gian Piero Celata (Enea Casaccia, Roma)
Renzo Di Felice (Università di Genova)
Arianna Bonzanini (Università di Brescia)
Gianluca Losi (Università di Brescia)
Gian Paolo Beretta (Università di Brescia)
Anna Valenti (ANIMP, Milano).

- **SCIENTIFIC SECRETARIAT:** UNIVERSITA' DEGLI STUDI DI BRESCIA - Dipartimento di Ingegneria Meccanica e Industriale (DIMI)
Arianna Bonzanini (a.bonzanini001@studenti.unibs.it)
- **CONFERENCE SECRETARIAT:** ANIMP ITALIAN ASSOCIATION OF INDUSTRIAL PLANT ENGINEERING – MILAN, Via Enrico Trazzoli, 6:
Beatrice Lestani (beatrice.lestani@animp.it)
Valeria Massari (valeria.massari@animp.it)
tel. +039 02 67100740

More info available at <http://animp.it/MFIP2017/>