

The 3rd International Conference on Numerical Methods in Multiphase Flows

ICNMMF-III

June 26-29 2017, Tokyo, Japan

June 26, Monday

18:00-20:00 Welcome Reception

June 27, Tuesday

8:00- Registration

8:30-8:45 Opening Remarks

8:45-9:30 *Plenary lecture 1.* Room A, Chair: Yoichiro Matsumoto (RIKEN)

Andrea Prosperetti (University of Houston)

Fully resolved simulations of disperse particle flows

9:30-10:00 Coffee break

10:00-10:30 *Keynote lectures 1, 2.*

Room A, Chair: Gretar Tryggvason (University of Notre Dame)

Huaxiong Huang (The Fields Institute), Kazuyasu Sugiyama (Osaka University)

An immersed boundary method for mass transfer across permeable interfaces

Room B, Chair: Dominique Legendre (Institut de Mécanique des Fluides de Toulouse)

Naoki Shikazono (The University of Tokyo)

Liquid film thickness in steady and unsteady micro tube slug flows

10:40-12:00

Session A1: bubbly turbulence (1), Chair: Efsthios E. Michaelides (Texas Christian University)

(Session A1 will be started from 11:00)

A11. Effects of the volume fraction on turbulent bubbly flow in a vertical pipe

Kiyoung Kim (1), Jungwoo Kim (2), Haechon Choi (1)

(1) Seoul National University, Korea; (2) Seoul National University of Science & Technology, Korea

A12. A new model for bubble-induced turbulence based on direct numerical simulation data

Tian Ma (1), Claudio Santarelli (2), Thomas Ziegenhein (1), Dirk Lucas (1), Jochen Fröhlich (2)

(1) Helmholtz-Zentrum Dresden-Rossendorf, Germany; (2) TU Dresden, Germany

A13. DNS studies of the effect of surfactants and coalescence on bubbly upflows in vertical channels

Gretar Tryggvason, Jiakai Lu

University of Notre Dame, USA

Session B1: particle (1), Chair: Anthony Wachs (University of British Columbia)

B11. A three dimensional cut cell immersed boundary solver based on the discontinuous Galerkin method

Dennis Krause, Florian Kummer, Martin Oberlack

TU Darmstadt, Germany

B12. A novel non-iterative immersed boundary method for rigid particles of arbitrary density ratio

Silvio Tschisgale (1), Tobias Kempe (2), Jochen Fröhlich (1)

(1) TU Dresden, Germany; (2) Institut für Luft- und Kältetechnik Dresden, Germany

B13. Development of a 2D multiphase Immersed Boundary solver for the simulation of particle dynamics at fluid-fluid

interfaces

Adam O'Brien, Markus Bussmann

University of Toronto, Canada

B14. Effect of conductive and convective heat fluxes in dense solid-dispersed two-phase flows

Jingchen Gu, Shintaro Takeuchi, Takeo Kajishima

Osaka University, Japan

Session C1: application (1), Chair: Robert Kunz (The Pennsylvania State University)

C11. Coupling of Volume of Fluid and Level Set methods in condensing heat transfer simulations

Recep Kahraman, Gavin Tabor

University of Exeter, UK

C12. Simulations of struvite reactive precipitation in hydrodynamic vortex separator

Bernardas Jankauskas (1,2,3), Gavin Tabor (1), Daniel Jarman (2)

(1) University of Exeter, UK; (2) Hydro International, UK; (3) Cranfield University, UK

C13. 3D simulation of pinning of droplets on tilted surfaces with OpenFOAM

Daniel Rettenmaier, Holger Marschall, Dieter Bothe, Cameron Tropea

TU Darmstadt

C14. Combined multifluid-population balance method for polydisperse multiphase flows

Simon Lo, Alexander Vikhansky

CD-adapco, UK

Session D1: compressible (1) , Chair: Feng Xiao (Tokyo Institute of Technology) (Session D1 will be started from 11:00)

D11. Fully-coupled algorithm for interfacial flows at all speeds

Fabian Denner, Cheng-Nian Xiao, Berend van Wachem

Imperial College London, UK

D12. Investigation of an implicit compressible Volume of Fluid formulation using *Basilisk*

Daniel Fuster, Stephane Popinet

Sorbonne Universités, France

D13. A multi-resolution conservative sharp-interface method for compressible multi-material flows based on the multi-region level-set method

Shucheng Pan, Xiangyu Hu, Nikolaus. A. Adams

TU München, Germany

12:00-13:15 *Lunch*

13:15-14:00 *Plenary lecture 2*. Room A, Chair: Sivaramakrishnan Balachandar (University of Florida)

Jacobus Derksen (University of Aberdeen)

Hydrodynamic interactions and mass transfer in suspensions – a particle's perspective

14:10-14:40 *Keynote lectures 3, 4*.

Room A, Chair: Andrea Prosperetti (University of Houston)

Anthony Wachs (University of British Columbia)

Computing flows laden with particles of arbitrary shape

Room B, Chair: Raad Issa (Imperial College London)

Holger Marschall (Technical University of Darmstadt)

Direct numerical simulation of bubbly flows

14:40-15:10 *Coffee break*

15:10-16:30

Session A2: bubbly turbulence (2), Chair: Yosuke Hasegawa (The University of Tokyo)

A21. CFD-simulation of different bubbly flow situations applying the Euler-Euler framework

Eckhard Krepper, Dirk Lucas, Roland Rzehak

Helmholtz-Zentrum Dresden-Rossendorf, Institute of Fluid Dynamics, Germany

A22. A DNS-VOF study of the effect of bubbles on turbulent statistics in a channel flow

Paolo Cifani (1), G.J.M. Priems (2), W. Michalek (2), J.G.M. Kuerten (2,1), C.W.M. Geld (2), B.J. Geurts (1,2)

(1) University of Twente, The Netherlands; (2) Eindhoven University of Technology, The Netherlands

A23. Effect of the turbulent contribution of the added mass force in bubbly jet flow

Aroua Aouadi, Bellakhal, Jamel Chahed

University of Tunis El Manar, Tunisia

A24. Homogeneous turbulence structure and self-preservation in uniformly sheared bubbly flow

Hela Ayeb Mrabtini, Ghazi Bellakhal, Jamel Chahed

National Engineering School of Tunis, Tunisia

Session B2: particle (2), Chair: Naoki Takada (National Institute of Advanced Industrial Science and Technology)

B21. Direct numerical simulation of reactive fluid-solid systems using a Ghost-cell based Immersed Boundary method

Jiangtao Lu, E.A.J.F. Peters, J.A.M. Kuipers

Eindhoven University of Technology, The Netherlands

B22. Closures for discrete suspension flow models: new insight from particle-resolved simulations and spatial data filtering

Federico Municchi, Stefan Radl

TU Graz, Austria

B23. A 3D Immersed Boundary-Lattice Boltzmann method for simulating large-scale particulate flows

Baili Zhang, Ming Cheng, Jing Lou

Institute of High Performance Computing, Singapore

B24. Particle shape effects on sedimentation of particles

Satoshi Yokojima, Hideyoshi Asada

Shizuoka University, Japan

Session C2: application (2), Chair: Kazuya Shimizu (The University of Tokyo)

C21. A modelling framework for the development of fuel-coolant interaction applications

Christophe Fochesato, Magali Zabiégo

CEA Cadarache, DEN/CAD/DTN/LPMA, France

C22. High-performance numerical model for multiphase flows with polyhedral grids and applications to sanitary-ware

Akio Ikebata (1), Feng Xiao (2)

(1) TOTO LTD., Japan; (2) Tokyo Institute of Technology, Japan

C23. Application of an immersed boundary method with analytical interface approximation to a bubble chain in liquid metal

Benjamin Krull (1), Stephan Schwarz (1), Jochen Fröhlich (1) E.Strumpf (2), N. Shevchenko (2), O. Keplinger (2), S. Eckert (2)

(1) TU Dresden, Germany; (2) Helmholtz-Zentrum Dresden-Rossendorf, Germany

C24. Innovative computing for complex multiphase flows

Damir Juric (1), Jalel Chergui (1), Seungwon Shin (2), Lyes Kahouadji (3), Richard V. Craster (4), Omar K. Matar (3)

(1) CNRS-LIMSI, France; (2) Hongik University, Korea; (3) Imperial College London, UK; (4) Imperial College London, UK

Session D2: compressible (2), Chair: Keh-Ming Shyue (National Taiwan University)

D21. A robust and accurate MUSCL multislope scheme for particle laden flow: application to solid rocket motor instabilities

Valentin Dupif (1,2,3), Marc Massot (2,3,4), Joël Dupays (1), Frédérique Laurent (2,3), Clément Le Touze (1)

(1) ONERA, France; (2) Université Paris-Saclay, France; (3) Fédération de Mathématiques de l'Ecole Centrale Paris, France; (4) École polytechnique, France

D22. Numerical investigation on the influence of gas-particle two-way coupling to the shock fluid in Lagrangian framework

Dawei Chen, Haiquan Sun, Pei Wang, Xijun Yu, Dongjun Ma

Institute of Applied Physics and Computational Mathematics, China

D23. High-resolution capturing of discontinuities for multi-component flows

Yang-Yao Niu (1), Tsung-Yu Yang (2), Feng Xiao (3)

(1) Tamkang University, Taiwan; (2) Corning Display Technologies Taiwan, Taiwan; (3) Tokyo Institute of Technology, Japan

D24. Simulation of compressible multiphase flows near the critical point using a sharp interface method

Timon Hitz (1), Stefan Fechter (2), Fabian Föll (1), Christoph Müller (1), Claus-Dieter Munz (1)

(1) University of Stuttgart, Germany; (2) German Aerospace Center, Germany

16:40-18:00

Session A3: bubble (1), Chair: Masao Watanabe (Hokkaido University)

A31. Direct numerical simulation of nucleate pool boiling at large microscopic contact angle and moderate Jakob number

Grégory Huber, Sébastien Tanguy, Catherine Colin

Université de Toulouse, France

A32. A hierarchical block structured space-time spectral element method for simulating complex multiphase flows

Chaoxu Pei, Mark Sussman, M. Yousu Hussaini

Florida State University, USA

A33. A local level set finite element method for simulating bubble rising by using adaptive unstructured meshes

Long Cu Ngo, Hyoung Gwon Choi

Seoul National University of Science and Technology, Korea

A34. An extended discontinuous Galerkin method for transient multiphase flows

Martin Smuda, Florian Kummer, Thomas Utz

TU Darmstadt, Germany

Session B3: particle (3), Chair: Duan Zhang (Los Alamos National Laboratory)

B31. Modifications to the kinetic theory as applied to dense granular particulate flows

Efstathios E. Michaelides (1), Yifei Duan (2), Zhi-Gang Feng (2), Shaolin Mao (3)

(1) Texas Christian University, USA; (2) University of Texas at San Antonio, USA; (3) University of Texas at El Paso, USA

B32. A homogenized Lattice Boltzmann method for the simulation of arbitrary-shaped 3D particle in a fluid flow

Mathias J. Krause, Fabian Klemens, Thomas Henn, Robin Trunk, Hermann Nirschl

Karlsruhe Institute of Technology, Germany

B33. A fourteen-moment bi-Gaussian closure for the simulation of disperse multiphase flows

Jérémie Laplante (1), Clinton P. T. Groth (1), Frédérique Laurent (2,3), Aymeric Vié (2,3)

(1) University of Toronto Institute for Aerospace Studies, Canada; (2) Université Paris-Saclay Grande Voie des Vignes, France; (3) Fédération de Mathématiques de l'Ecole Centrale Paris, France

B34. An efficient particle tracking algorithm for Monte Carlo particles on unstructured spectral element grids

Jonathan Komperda, Farzad Mashayek

University of Illinois at Chicago, USA

Session C3: scheme, Chair: Holger Marschall (Technical University of Darmstadt)

C31. A variational approach to design a numerical scheme on an arbitrary moving grid for N-fluid flow with thermodynamic consistency

Thibaud Vazquez-Gonzalez (1), Antoine Llor (1), Christophe Fochesato (2)

(1) CEA, DAM, France; (2) CEA, DEN, DTN/SMTA/LPMA, France

C32. Numerical modelling of underwater explosions of aluminized explosives using an extension of five-equation model

Zhiwei Feng, Jili Rong, Dalin Xiang, Xuan He

Beijing Institute of Technology, China

C33. On positivity-preserving for multi-resolution and multi-phase simulations

Shucheng Pan, Xiangyu Hu, Nikolaus. A. Adams

TU München, Germany

C34. Validity of the two-fluid model in vertical intermittent flow

Raad Issa, Francesco Galleni,

Imperial College London, UK

Session D3: cavitation (1), Chair: Kazuyasu Sugiyama (Osaka University)

D31. Simulation of hydraulic flip in cavitating nozzles using one-fluid and two-fluid equilibrium models

Mathis Bode (1), Florian vom Lehn (1), Sutharsan Satcunanathan (1), Vincent Le Chenadec (2), Heinz Pitsch (1)

(1) RWTH Aachen University, Germany; (2) University of Illinois at Urbana-Champaign, USA

D32. Numerical investigation of bubble nuclei characteristics on cavitating flow around a hydrofoil by homogeneous flow approach

Wakana Tsuru, Satoshi Watanabe, Shin-ichi Tsuda

Kyushu University, Japan

D33. The numerical analysis of the nose shape effect on the flight stability of the underwater projectile

Kohei Okuno, Akiko Matsuo

Keio University, Japan

D34. Modeling and numerical simulations of bubble cloud dynamics in a focused ultrasound field

Kazuki Maeda, Tim Colonius

California Institute of Technology, USA

June 28, Wednesday

8:45-9:30 *Plenary lecture 3*. Room A, Chair: Shu Takagi (The University of Tokyo)

Tim Colonius (California Institute of Technology)

Numerical simulation of cavitation in ultrasound and shockwave therapy

9:30-9:50 *Coffee break*

9:50-10:20 *Keynote lectures 5, 6*.

Room A, Chair: Jacobus Derksen (University of Aberdeen)

Yosuke Imai (Tohoku University)

Multiphase flow simulation for understanding cellular flow and adhesion in capillaries

Room B, Chair: Stéphane Zaleski (Institut Jean Le Rond d'Alembert UPMC & CNRS)

Niels Deen (Eindhoven University of Technology)

Bubbles on the cutting edge: how to intensify gas-liquid contactors

10:30-11:50

Session A4: FSI / suspension, Chair: Akio Tomiyama (Kobe University)

A41. Turbulent channel flow over hyperelastic walls

Marco E. Rosti, Luca Brandt

Linné Flow Centre and SeRC, KTH Mechanics, Sweden

A42. Numerical study on rheology of filament suspensions in the inertial regime

Arash Alizad Banaei, Marco Edoardo Rosti, Luca Brandt

Linné FLOW Centre and SeRC, KTH Mechanics, Sweden

A43. Deformable particle suspensions in shear flow

Luca Brandt, Marco E. Rosti

Linné Flow Centre and SeRC, KTH Mechanics, Sweden

A44. Numerical simulations of two-phase flows in irregular domains and fluid-membrane interaction

Alexis Dalmon (1,2,3), Mathieu Lepilliez (1), Sebastien Tanguy (1)

(1) Institut de Mécanique des Fluides de Toulouse, France; (2) Centre National d'Etudes Spatiales, France; (3)

Airbus Defence & Space, France

Session B4: particle (4) , Chair: Dirk Lucas (Helmholtz-Zentrum Dresden-Rossendorf)

B41. Analysis of solid-liquid mixing in a stirred tank through CFD-DEM coupling and tomography

Cindy Tran, Mohammadreza Ebrahimi, Farhad Ein-Mozaffari, Ali Lohi

Ryerson University, Canada

B42. A comparison of quadrature-based moment methods to Eulerian-Lagrangian methods for particle-laden flows

Ravi G. Patel (1), Bo Kong (2), Jesse Capecehatro (3), Rodney O. Fox (4), Olivier Desjardins (1)

(1) Cornell University, USA; (2) Ames Laboratory, USA; (3) University of Michigan, USA; (4) Iowa State University, USA

B43. Large-Eddy Simulation of turbulent dispersed flow: Modelling subgrid effects on particle dispersion

Cristian Marchioli (1), Alfredo Soldati (2)

(1) University of Udine, Italy; (2) TU Wien, Austria

B44. Towards Large Eddy Simulation of two-way coupled disperse phase flows

David Mercier (1), Aymeric Vié (1,2), Marc Massot (1,2,3)

(1) Université Paris-Saclay, France; (2) Fédération de Mathématiques de l'École Centrale Paris, France; (3) École polytechnique, France

Session C4: spray / jet, Chair: Damir Juric (CNRS-LIMSI)

C41. Improving both numerical analysis of experimental data and computational models for detailed comparisons in a pulsated polydisperse spray counterflow configuration

Dennis Dunn (1), Jorge-César Brändle de Motta (2), Laurent Zimmer (1), Aymeric Vié (1,3), Matthieu Boileau (1,6), Marc Massot (1,3,4), Eleonore Riber (5)

(1) Université Paris-Saclay, France; (2) Université de Rouen Site Universitaire du Madrillet, France; (3) Fédération de Mathématiques de l'Ecole Centrale Paris, France; (4) École polytechnique, France; (5) CERFACS, France; (6) IRMA, CNRS UMR, France

C42. Near critical jet simulations with a discontinuous Galerkin method and tabulated general equations of state

Fabian Föll (1), Stefan Fechter (2), Timon Hitz (1), Claus-Dieter Munz (1)

(1) University of Stuttgart, Germany; (2) German Aerospace Center, Germany

C43. Direct numerical simulation of spray formation in a turbulent gas-liquid mixing layer with a momentum-conserving Volume-of-Fluid method

Yue Ling (1) Daniel Fuster (2), Grétar Tryggvason (3), Stéphane Zaleski (2)

(1) Baylor University, USA; (2) Sorbonne University, France; (3) University of Notre Dame, USA

C44. Statistical modeling of the gas-liquid interface using high order moment method for polydisperse evaporating sprays toward a coupling with separated flows in automotive engine

Mohamed Essadki (1,2,3), Florence Druil (1,2), Stephane de Chaisemartin (2), Adam Larat (1,2), Frederique Laurent (1,2), Thibaut Menard (5), Marc Massot (1,2,4)

(1) CentraleSupélec, Université Paris-Saclay, France; (2) Fédération de Mathématiques de l'Ecole Centrale Paris, France; (3) IFP Energies nouvelles, France; (4) École polytechnique, France; (5) Laboratoire CORIA, France

Session D4: compressible (3) , Chair: Takeo Kajishima (Osaka University)

D41. Compressible Navier-Stokes simulation of wall shear stress from non-spherical bubble collapse

Tomoki Kondo, Keita Ando

Keio University, Japan

D42. Simulations of compressible multiphase flows with BVD-WENO-THINC algorithm

Xi Deng (1), Feng Xiao (1), Keh-Ming Shyue (2)

(1) Tokyo Institute of Technology, Japan; (2) National Taiwan University, Taiwan

D43. An operator splitting method for the Lordanski-Kogarko-Wijngaarden model of bubbly flow in liquid

Keh-Ming Shyue

National Taiwan University, Taiwan

D44. An Eulerian-Lagrangian method for both dilute and dense compressible multiphase flows

Dong-Jun Ma (1), Bao-Rui Wang (2), Da-Wei Chen (1), Hai-Quan Sun (1), Pei Wang (1)

(1) Institute of Applied Physics and Computational Mathematics, China; (2) Chinese Academy of Sciences, China

11:50-12:55 Lunch

12:55-13:40 *Plenary lecture 4.*, RoomA, Chair: Alfredo Soldati (TU Wien; University of Udine)

Djamel Lakehal (ASCOMP)

Advances in DNS and LES of turbulent interfacial & dispersed multiphase flows

13:50-14:20 *Keynote lectures 7,8.*

Room A, Chair: Toshiyuki Sanada (Shizuoka University)

Dirk Lucas (Helmholtz-Zentrum Dresden-Rossendorf)

Simulation of flow pattern transitions in the Euler-Euler framework

Room B, Chair: Haecheon Choi (Seoul National University)

Shintaro Takeuchi (Osaka University)

Effect of temperature gradient within the solid particles on the heat transfer in dense particle-dispersed flows

14:20-15:05 *Poster session & Coffee Break*

P01. BLUE: A high performance code for simulation of complex multiphase flows

Jalel Chergui (1), Damir Juric (1), Seungwon Shin (2), Lyes Kahouadji (3), Richard V. Craster (4), Omar K. Matar (3)

(1) CNRS-LIMSI, Orsay, France; (2) Hongik University, Korea; (3) Imperial College London, UK; (4) Imperial College London, UK

P02. Boundary conditions for modeling of moving contact lines

Hanna Holmgren, Gunilla Kreiss

Uppsala University, Sweden

P03. Numerical simulation of red blood cell flow in coronary microcirculation

Shohei Hodota (1), Boyang Tang (1), Kazuya Shimizu (1), Satoshi Ii (2), Kazuyasu Sugiyama (2), Shu Takagi (1)

(1) The University of Tokyo, Japan; (2) Osaka University, Japan

P04. Flow dynamics of coalescing and non-coalescing bubbles in a vertical channel

Varun Jadon (1), Shu Takagi (1), Kazuyasu Sugiyama (2)

(1) The University of Tokyo, Japan; (2) Osaka University, Japan

P05. Flow analysis of the dam break problem with the density function method

Koichi Tsubogo

The Open University of Japan, Japan

P06. Particle dispersion in a double-diffusive turbulent layer

Jordi Pallares

Universitat Rovira i Virgili, Spain

P07. Three-dimensional numerical simulations of the motion of a bubble passing through a liquid-liquid layer

Kenta Tsubota (1), Mitsuhiro Ohta (1), Mark Sussman (2)

(1) Tokushima University, Japan; (2) Florida State University, USA

P08. Moving contact line treatment using a finite volume ALE interface-tracking method

Dirk Grunding, Dieter Bothe, Holger Marschall

TU Darmstadt, Germany

P09. Modeling and VOF based simulation of dynamic contact lines

Mathis Fricke, Dieter Bothe

TU Darmstadt, Germany

15:05-16:05

Session A5: bubble (2), Chair: Tim Colonius (California Institute of Technology)

A51. Numerical simulation of departure from nucleate boiling (DNB)

Yohei Sato, Bojan Niceno

Paul Scherrer Institute, Switzerland

A52. A numerical approach for simulations of collapsing bubbles near rigid and soft materials

Eric Johnsen, Shahaboddin Alahyari Beig, Mauro Rodriguez

University of Michigan, USA

A53. DNS of a rising bubble in a viscoelastic liquid

Matthias Niethammer (1), Holger Marschall (1), Gunter Brenn (2), Dieter Bothe (1)

(1) TU Darmstadt, Germany; (2) TU Graz, Austria

Session B5: particle (5), Chair: Akio Tomiyama (Kobe University)

B51. Accurate particle-mesh methods for simulating electrically charged particle-laden flows

Jesse Capecelatro, Yuan Yao

University of Michigan, USA

B52. Improvements of four-way coupled Euler/Lagrange numerical models by multi-scale simulation, high performance computing

Amir Esteghamatian, Anthony Wachs

University of British Columbia, Canada

B53. A point-particle approach that captures fully-resolved physics for particle-laden flows

S. Balachandar, G. Akiki, D. Zwick

University of Florida, USA

Session C5: dam break / debris, Chair: Yuta Yoshimoto (The University of Tokyo)

C51. Dam breaking simulations: a comparison of two compressible approaches with experimental data

Florence Drui (1), Stéphane Vincent (2), A. Larat (1,3), S. Kokh (4), M. Massot (5)

(1) Laboratoire EM2C, France; (2) Université Paris-Est Marne-La-Vallée, France; (3) Fédération de Mathématiques de l'Ecole Centrale Paris, France; (4) CEA/DEN/DANS/DM2S/STMF, France; (5) CMAP, France

C52. A VOF-based finite volume method for numerical simulation of weakly-compressible two-phase flows using higher order schemes

Zhe Li, Guillaume Oger, David Le Touzé

École Centrale de Nantes/CNRS, France

C53. Numerical modelling of debris accumulations at Masonry Bridge Piers and its influence on scouring

Riella, M., Kahraman, R., Kripakaran, P., Djordjevic, S., Ebrahimi, M., Tabor, G.

University of Exeter, UK

Session D5: cavitation (2), Chair: Shin-ichi Tsuda (Kyushu University)

D51. A numerical model for three-phase liquid-vapor-gas flows with interfaces and cavitation

Marica Pelanti

Institute of Mechanical Sciences and Industrial Applications, France

D52. Numerical simulation of ultrasound propagation in fluid impacting with cavitating bubble cluster

Xiuxiu Lyu, Xiangyu Hu, Nikolaus A. Adams

TU München, Germany

D53. A new perspective on cavitation modeling: Improved bubble growth and transport modeling

Michael Kinzel, Robert Kunz, Jules W. Lindau

The Pennsylvania State University, USA

16:15-17:15

Session A6: bio / biomass, Chair: Yosuke Imai (Tohoku University)

A61. Blood flow simulation on platelet adhesion by an immersed boundary method with GPIIb-IIIa-VWF bond formation modelling

Kazuya Shimizu (1), Kazuyasu Sugiyama (2), Shu Takagi (1)

(1) The University of Tokyo, Japan; (2) Osaka University, Japan

A62. Numerical simulation of bubbly flows in an aeration tank with biochemical reactions

Khateeb Noor Ul Huda, Kazuya Shimizu, Shu Takagi

The University of Tokyo, Japan

A63. Direct numerical simulation of biomass-coal co-firing in a turbulent channel flow

A. Awasthi (1), J. G. M. Kuerten (1,2), B. J. Geurts (1,2)

(1) Eindhoven University of Technology, The Netherlands; (2) University of Twente, The Netherlands

Session B6: drop (1), Chair: Takeo Kajishima (Osaka University)

B61. Viscosity-modulated breakup and coalescence of large drops in bounded turbulence

Alessio Roccon (1,2), Francesco Zonta (2), Alfredo Soldati (1,2)

(1) TU Wien, Austria; (2) University of Udine, Italy

B62. Numerical simulation of pressure generated at the liquid droplet impact on a solid surface

Yuki Tatekura (1), Masao Watanabe (1), Kazumichi Kobayashi (1), Toshiyuki Sanada (2)

(1) Hokkaido University, Japan; (2) Shizuoka University, Japan

B63. Numerical simulations of multiphase flows using the CIP-CSL3ENO scheme

Qijie Li, Kensuke Yokoi

Cardiff University, UK

Session C6: interface & wettability, Chair: Dominique Legendre (Institut de Mécanique des Fluides de Toulouse)

C61. The importance of mass and momentum conservation in simulating multiphase flows

Robert Chiodi (1), Mark Owkes (2), Olivier Desjardins (1)

(1) Cornell University, USA; (2) Montana State University, USA

C62. GNBC-based front-tracking method for 3D simulation of droplet motion on solid surface

Xinglong Shang, Zhengyuan Luo, Bofeng Bai

Xi'an Jiaotong University, China

C63. Numerical simulation of motion of fine droplet on structured solid surface using Phase-Field model-based Lattice-Boltzmann method

Naoki Takada, Kazuma Kurihara, Ryohei Hokari, Sohei Matsumoto

National Institute of Advanced Industrial Science and Technology, Japan

Session D6: interface / scheme (1), Chair: Stéphane Zaleski (Institut Jean Le Rond d'Alembert UPMC & CNRS)

D61. A novel variant of the THINC method with quadratic interface representation on arbitrary and hybrid unstructured grids

Feng Xiao, Bin Xie

Tokyo Institute of Technology, Japan

D62. Evaluating curvature for the Volume of Fluid method via interface reconstruction

Fabien Evrard, Fabian Denner, Berend van Wachem

Imperial College London, UK

D63. On a relation between the sharp and diffusive interface models

Tomasz Waławczyk

Warsaw University of Technology, Poland

18:30-20:30

Banquet

June 29, Thursday

8:45-9:30 *Plenary lecture 5*. Room A, Chair: Robert Kunz (The Pennsylvania State University)

HiroYuki Takahira (Osaka Prefecture University)

Numerical investigations for the growth and collapse of bubbles near boundaries

9:30-10:00 *Coffee break*

10:00-10:30 *Keynote lectures 9,10*.

Room A, Chair: Efsthios E. Michaelides (Texas Christian University)

Emilio Baglietto (Massachusetts Institute of Technology)

A truly predictive method for critical heat flux is it even possible?

Room B, Chair: Dieter Bothe (Technische Universität Darmstadt)

Mikio Sakai (The University of Tokyo)

How can the DEM be applied in industrial powder processes?

10:40-12:00

Session A7: drop (2), Chair: Toshiyuki Sanada (Shizuoka University)

A71. Coupling a hierarchy of diffuse interface model with kinetic-based moment methods for primary atomization simulations in liquid propulsion

Pierre Cordesse (1,2), Angelo Murrone (1), Marc Massot (2,3), Clément Le Touze (1), Aymeric Boucher (1)

(1) ONERA, France; (2) Université Paris-Saclay, France; (3) École polytechnique, France

A72. Evaluation of an Eulerian-Lagrangian spray atomization (ELSA) Model: Modeling of coupling between dense and disperse regions

Timothy F. Leung (1), Clinton P. T. Groth (1), John T. C. Hu (2)

(1) University of Toronto Institute for Aerospace Studies, Canada; (2) Pratt & Whitney, Canada

A73. Direct numerical simulation of evaporating droplets

Romain Alis (1,2), Sébastien Tanguy (1), Olivier Rouzaud (2), Jean-Luc Estivalezes (1,2)

(1) Institut de Mécanique des Fluides de Toulouse, France; (2) Office National d'Etudes de Recherches Aéronautiques, France

A74. Direct numerical simulation of evaporating drops at laminar and turbulent conditions

Christopher A. Edelmann, Patrick C. Le Clercq, Berthold Noll

German Aerospace Center, Germany

Session B7: interface / turbulence, Chair: Shintaro Takeuchi (Osaka University)

B71. A Volume of Fluid dual scale approach for modeling turbulent liquid/gas phase interfaces

Dominic Keddy, James Uglietta, Marcus Herrmann

Arizona State University, USA

B72. On the ADM-tau model for sub-grid surface tension in two phase flow Large Eddy Simulations

Wojciech Aniszewski

Sorbonne Universities, France

B73. Modeling of intermittency region in stratified air-water flows

Marta Waclawczyk (1), Tomasz Waclawczyk (2)

(1) University of Warsaw, Poland; (2) Warsaw University of Technology, Poland

B74. Phase dispersion modeling in dispersed liquid-liquid flow in vertical pipe flow

Mariam Rezig, Ghazi Bellakal, Jamel Chahed

University of Tunis El Manar, Tunisia

Session C7: interface / scheme (2), Chair: Mark Sussman (Florida State University)

C71. A two-dimensional conservative front-tracking method for multi-scale multiphase flows

Mathilde Tavares, Eric Chénier, Stéphane Vincent

Université Paris-Est, France

C72. A second order convergent PLIC algorithm for unstructured meshes

Tomislav Maric, Holger Marschall, Dieter Bothe

TU Darmstadt, Germany

C73. An efficient and stable interface method for SPH

Mingyu Zhang

Institute of Applied Physics and Computational Mathematics, China

C74. Spurious currents reduction in two-phase flow numerical simulations using the Front tracking with non-uniform Lagrangian markers distribution

Mijail Febres, Dominique Legendre

Institut de Mécanique des Fluides de Toulouse, France

Session D7: scheme (2), Chair: Andrea Prosperetti (University of Houston)

D71. Numerical quadrature of surface integrals using the surface Laplace-Beltrami operator

Johannes Kromer, Dieter Bothe

TU Darmstadt, Germany

D72. Dual domain material point method for multi-velocity formulations

Duan Zhang

Los Alamos National Laboratory, USA

D73. Newton linearization and iterative schemes for Eulerian n-Fluid systems

Robert F. Kunz, İlker Topçuoğlu, Sean M. McIntyre

The Pennsylvania State University, USA

D74. Modeling cyclic packed bed reactors using unit-cell concept in CFD

Soumendu Dasgupta, Arnab Atta

Indian Institute of Technology Kharagpur, India

12:00-13:15 *Lunch*

13:15-14:00 *Plenary lecture* 6. Room A, Chair: Takeo Kajishima (Osaka University)

Dominique Legendre (Institut de Mécanique des Fluides de Toulouse)

The use of direct numerical simulation for the exploration of bubble dynamics

14:10-14:40 *Keynote lectures* 11,12

Room A, Chair: Tim Colonius (California Institute of Technology)

Kosuke Hayashi (Kobe University)

Numerical simulation of contaminated bubbles and drops using level set method

Room B, Chair: Yosuke Hasegawa (The University of Tokyo)

Cristian Marchioli (University of Udine)

Non-spherical particles in turbulence: numerical modelling and computation

14:40-15:10 *Coffee Break*

15:10-16:30

Session A8: drop (3), Chair: Cristian Marchioli (University of Udine)

A81. Hydrodynamics and mass transfer from a spherical droplet moving through a continuous phase

Azeddine Rachih (1,2), Sophie Charton (1), Dominique Legendre (2), Eric Climent (2)

(1) CEA, DEN, DMRC, France; (2) Universite de Toulouse, France

A82. Advances in adaptive numerical techniques for the simulation of incompressible interfacial flows

Pablo Gómez (1), Claudio Zanzi (1), Joaquín López (2), Julio Hernández (1)

(1) Universidad Nacional de Educación a Distancia, Spain; (2) Universidad Politécnica de Cartagena, Spain

A83. A fast mass-preserving interface-correction level set/ghost fluid method for colloidal droplets under depletion forces

Zhouyang Ge, Outi Tammisola, Luca Brandt

Linné Flow Centre and Swedish e-Science Research Centre, KTH Mechanics, Sweden

A84. A conservative level set approach to investigate drop spreading on a porous surface

Sheng Wang, Olivier Desjardins

Cornell University, USA

Session B8: wettability / tension, Chair: Emilio Baglietto (Massachusetts Institute of Technology)

B81. Extending a hybrid Level Set / Front Tracking method for the simulation of surface tension driven flows

Tobias Tolle, Tomislav Maric, Holger Marschall, Dieter Bothe

TU Darmstadt, Germany

B82. Effects of impact velocity and wettability on spread factor in the early stage of spreading

Yang Xu, Stéphane Vincent, Qi-chang He, Hung Le-Quang

Université Paris-Est, France

B83. Interfacial flows and solid boundaries treatment in Smoothed Particle Hydrodynamics

Michał Olejnik, Jacek Pozorski

Polish Academy of Sciences, Poland

B84. Effective slip for flow through lubricant-impregnated surfaces under thermocapillary action

Rui Sun, Chiu-on Ng

The University of Hong Kong, Hong Kong

Session C8: interface / scheme (3), Chair: Kosuke Hayashi (Kobe University)

C81. Moment-of-fluid interface reconstruction with two connected lines

Qinghong Zeng, Wenjun Sun

Institute of Applied Physics and Computational Mathematics, China

C82. Adaptive interface sharpening scheme for modelling multiple flow regimes

Mohit Tandon, Vinesh H. Gada, Ananya Ravi, Raghavendra Krishnamurthy

Siemens PLM, India

C83. A thickening method to simulate interfaces with phase change using the Second Gradient theory

Davy Navgizente, Thomas Schmitt, Sebastien Ducruix

Université Paris-Saclay, France

C84. Flux-correction for fully embedded concentration boundary layers in FV-based solvers

Dieter Bothe, Andre Weiner

TU Darmstadt, Germany

16:40-16:55 *Closing Remarks*