SPHERIC’2014 programme

Red stars* spot the Libersky prize candidates.

Tuesday June 3

08:00 Registration

08:30 Opening of the 9th SPHERIC Workshop

08:45 Keynote – Bliss and woe of simulating compressible flows with SPH

Chair: N. Quinlan
A. Mokos, B.D. Rogers, P.K. Stansby
G. Fourtakas, B.D. Rogers, D. Laurence
A. Amicarelli, G. Agate
I. Zisis, R. Messahel, B. van der Linden,
M. Souli

09:40 Session 1 – Multiphase Flow 1

Paper 1.1 – A Multi-phase particle shifting algorithm for SPH simulations for violent hydrodynamics on a GPU

Paper 1.2 – 3-D SPH modelling of sediment scouring induced by rapid flows*

Paper 1.3 – SPH modelling of granular flows

Paper 1.4 – Two-phase benchmarks for SPH multiphase fully compressible schemes

10:45 Coffee Break

11:10 Session 2 – Incompressibility

Paper 2.1 – A non-Newtonian ISPH scheme for improved prediction of pressure fields*

Paper 2.2 – Buoyancy modelling with incompressible SPH and the unified semi-analytical wall boundary conditions*

Paper 2.3 – Modelling buoyancy and thermocapillary convection in molten metals using an incompressible SPH method

Paper 2.4 – Space potential particles as free-surface boundary condition in projection-based particle methods

Chair: P. Groenenboom
A.M. Xenakis, S.J. Lind, P.K. Stansby,
B.D. Rogers
A. Leroy, D. Violeau, M. Ferrand, A. Joly
C. Demuth, A. Mahrle, A.F. Lasagni
N. Tsuruta, A. Khayyer, H. Gotoh

12:15 Lunch

13:30 Session 3 – Surface Tension

Paper 3.1 – A Novel Laplacian-based surface tension model for particle methods

Paper 3.2 – On the issue of interface spurious fragmentations in multiphase SPH

Paper 3.3 – Numerical simulation of jet fragmentation in multi-fluid medium using Smoothed Particle Hydrodynamics

Paper 3.4 – Implementation of surface tension in flow polymer during Reactive Rotational Molding

Chair: P. Stansby
A. Khayyer, H. Gotoh, N. Tsuruta
K. Szewc, J. Pozorski, J.-P. Minier
T. Yue, A. Kruisbrink, F. Pearce, H. Morvan
A. Hamidi, S. Khelladi, L. Illoul, A. Tcharkhtchi

14:35 Session 4 – Boundary Conditions

Paper 4.1 – Exact computation of SPH wall renormalising integrals in 3-D

Paper 4.2 – Local Uniform STencil (LUST) boundary conditions for 3-D irregular boundaries in DualSPHysics*

Paper 4.3 – Explicit strategies for consistent kernel approximations*

Paper 4.4 – Open boundary conditions using the mirror ghost particle approach in OpenFOAM SPH*

Chair: T. Dalrymple
D. Violeau, A. Mayrhofer, A. Leroy
G. Fourtakas, R. Vacondio, J.M. Domínguez, A. Nasar, B.D. Rogers
M. Leonardi, T. Rung
B. Werdelmann, W. Krebs, R. Koch, H.-J. Bauer

15:40 Coffee Break

16:05 Session 5 – High Performance Computing

Paper 5.1 – MultiGPU, multi-node SPH implementation with arbitrary domain decomposition

Paper 5.2 – Towards a highly scalable Incompressible Smoothed Particle Hydrodynamics (ISPH) toolkit: Optimization for real applications

Paper 5.3 – Achieving the best accuracy in an SPH implementation

Paper 5.4 – Efficient implementation of double precision in GPU computing to simulate realistic cases with high resolution*

Chair: J. Monaghan
E. Rustico, J. Jankowski, A. Hérault, G. Bilotta, C. Del Negro
X. Guo, B.D. Rogers, S. Lind, P.K. Stansby, M. Ashworth
A. Hérault, G. Bilotta, R.A. Dalrymple
J.M. Domínguez, A.J.C. Crespo, A. Barreiro, B.D. Rogers, M. Gomez-Gesteira

17:10 Discussion Panel 1 – SPH Question Time

18:10 Reception
Wednesday June 4

08:30 Keynote – Simulating Free-Surface Viscous Flows with SPH: Theoretical and Practical Aspects

A. Colagrossi

Chair: B. Rogers

R. Paredes, L. Imas

W. Säckel, M. Huber, M. Hirschler, P. Kunz, U. Nieken

A.M. Taratakovskiy, U.B. Bandara, M. Oostrom, B. Palmer

A. N. Parshikov, S. A. Medin, A. V. Ivanov

09:25 Session 6 – Multiphase 2

Paper 6.1 – Application of multiphase SPH to fluid structure interaction problems

Paper 6.2 – Drying and morphology evolution of single droplets in spray processes

Paper 6.3 – Pairwise force Smoothed Particle Hydrodynamics multiphase flow model

Paper 6.4 – Application of SPH method using interparticle contact algorithms to mesomechanics of heterogeneous media

10:30 Coffee Break

10:55 Session 7 – Adaptivity

Paper 7.1 – 3-D SPH scheme with variable resolution: assessment of the optimal splitting refinement pattern

Paper 7.2 – Particle filling and the importance of the SPH inertia tensor

Paper 7.3 – Smoothed Particle Hydrodynamics with adaptive discretization

Paper 7.4 – Toward a higher order SPH-ALE method based on Moving Least Squares method

12:00 Lunch

13:15 Session 8 – Turbulence, Structures, Energy

Paper 8.1 – Flow structure detection with Smoothed Particle Hydrodynamics

Paper 8.2 – Large eddy simulation with SPH: Mission impossible?

Paper 8.3 – 2D turbulence using the SPH method

Paper 8.4 – Energy conservation in the δ-SPH scheme

14:20 Session 9 – Coupling


Paper 9.2 – Coupling of a SPH-ALE and a Finite Volume method. Extension to 2D and 3D

Paper 9.3 – Coupling between SWASH and SPH for real coastal problems

Paper 9.4 – Modeling and validation of guided ditching tests using a coupled SPH-FE approach

15:25 Coffee Break

15:50 Session 10 – Numerical Stability

Paper 10.1 – Momentum conserving methods that reduce particle clustering in SPH

Paper 10.2 – Pressure evaluation improvement for Euler isentropic SPH scheme

Paper 10.3 – Towards both numerical consistency and conservation for SPH approximation

Paper 10.4 – On SPH nonlocal regularisation method for instabilities due to strain-softening

16:55 Discussion Panel 2 – The needs of Industry

17:55 Steering Committee Meeting

19:15 Museum & Workshop Banquet
Thursday June 5

09:00 Session 11 – Water Waves
Paper 11.1 – On the model inconsistencies in simulating breaking wave with mesh-based and particle methods  
Chair: T. Rung  
S. Marrone, D. Le Touzé, A. Colagrossi, A. Di Mascio  
R. Jalali Farahani, R. A. Dalrymple, A. Hérault, G. Bilotta, E. Rustico  
X.Z. Lu, J.M. Cherfils, G. Pinon, E. Rivoalen, J. Brossard  

Paper 11.2 – Modeling the coherent vortices in breaking waves

Paper 11.3 – SPH numerical computations of wave impact onto a vertical wall

Paper 11.4 – Modelling of wave impacts on harbour structures and objects with SPH and DEM*

10:05 Coffee Break

10:30 Session 12 – Real-Life Applications
Paper 12.1 – Hydrodynamic performance simulations using SPH for automotive applications  
Chair: D. Le Touzé  
D. Barcarolo, J. Candelier, D. Guibert, M. de Lefèvre  
J.L. Cercos-Pita, A. Moreno, F. Beltran, L.M. Gonzalez  
G. Bilotta, A. Vorobyev, A. Hérault, A. Mayrhofer, D. Violeau  
B. Edge, R.A. Dalrymple, A. Hérault, K. Gamiel, G. Bilotta

Paper 12.2 – Simulation of earthquake sloshing loads in a nuclear reactor*

Paper 12.3 – Modelling real-life flows in hydraulic waterworks with GPUSPH

Paper 12.4 – Application of GPUSPH to design of wave energy converters

11:35 Session 13 – Alternative Approaches
Paper 13.1 – Multiphase and free-surface flows in the finite volume particle method  
Chair: X. Hu  
N.J. Quinlan  
E. Jahanbakhsh, C. Vessaz, F. Avellan  
J.M. Gimenez, L.M. Gonzalez, P. Galan del Sastre

Paper 13.2 – Finite Volume Particle Method for 3-D elasto-plastic solid simulation*

Paper 13.3 – Applications and improvements of the particle finite element method to free surface flows

Paper 13.4 – Voronoi-SPH: on the analysis of a hybrid Finite Volumes – Smoothed Particle Hydrodynamics method*

12:40 Lunch

13:55 Session 14 – Free-Surface Flow
Paper 14.1 – SPH modelling of wave pressures at vertical and perforated breakwaters  
Chair: S. Sibilla  
D.D. Meringolo, F. Aristodemo, P. Groenenboom, A. Lo Schiavo, P. Veltri, M. Veltri  
A. Kiara, R. Paredes, D.K.P. Yue  
H. Hashimoto, D. Le Touzé, N. Grenier, M. Sueyoshi  
A. Colagrossi, B. Bouscasse, A. Souto-Iglesias

Paper 14.2 – Evaluation of SPH in capturing flow separation points on hydrophobic and hydrophilic bodies during bluff water entry

Paper 14.3 – Investigation of ship flooding situations by MPS and SPH methods compared to dedicated experiments

Paper 14.4 – Energy decomposition analysis in free-surface flows: road-map for the direct computation of wave breaking dissipation

15:00 Session 15 – Miscellaneous
Paper 15.1 – Smoothed Particle Hydrodynamics (SPH) simulation of a high-pressure homogenizer  
Chair: M. Gomez-Gesteira  
L. Wietb, S. Braun, R. Koch, H.-J. Bauer, K. Kelemen, H. P. Schuchmann  
A. Bankole, A. Iske, T. Rung, M. Dumbser  
J. Kwon, J.J. Monaghan  
S.M. Longshaw, B.D. Rogers, P.K. Stansby

Paper 15.2 – A semi-implicit SPH scheme for the shallow water equations

Paper 15.3 – Multiphase SPH for liquid-dust flow and its application to sedimentation in a turbulently convecting flow

Paper 15.4 – Whale to turbine impact using the GPU based SPH-LSM method

16:05 Closing and Awards

16:20 Coffee and Goodbye