

# SPHERIC 2017 Programme

## 1st DAY: JUNE 13 (TUESDAY)

08:00-08:45 **Registration**

08:45-09:15 **Opening**

09:15-10:10 **Keynote 1: “Kernels and Convergence” by Prof. Holger Wendland, Universität Bayreuth. Chair: J. Monaghan**

10:10-11:15 **Session 1: CONVERGENCE AND STABILITY I Chair: D. Violeau**

- 1.1 “Targeting viscous flows around solid body at high Reynolds numbers with the  $\delta$ -plus SPH model”  
P. N. Sun, A. M. Zhang, A. Colagrossi, S. Marrone, M. Antuono
- 1.2 “Consistent Iterative shifting for SPH methods”  
R. Vacondio, B. D. Rogers
- 1.3 “A first order correction for the d-SPH scheme suitable for GPU implementation”  
M. D. Green, R. Vacondio, J. Peiró
- 1.4 “A high-accurate SPH-ALE-MOOD method”  
L. Ramírez, X. Nogueira, S. Clain, R. Loubère, A. Eirís, L. Cueto-Felgueroso, I. Colominas

11:15-11:45 **Coffee**

11:45-12:50 **Session 2: CONVERGENCE AND STABILITY II Chair: A. Khayyer**

- 2.1 “Mathematical Analysis of Characteristic Generalized Particle Methods for Convection-Diffusion Equations”  
D. Tagami
- 2.2 “Improving weakly compressible SPH with WENO reconstruction”  
C. Zhang, X. Y. Hu, N. A. Adams
- 2.3 “Investigating prescriptions for artificial resistivity in smoothed particle magnetohydrodynamics”  
J. Wurster, M. R. Bate, D. J. Price, T. S. Tricco
- 2.4 “Convergence rate of the SPH Poisson equation on a Cartesian grid”  
D. Violeau, S. J. Lind, W. Dehnen

12:50-13:40 **Session 3: INCOMPRESSIBILITY Chair: S. J. Lind**

- 3.1 “Study of implicit time-integration in truly incompressible SPH”  
M. Hirschler<sup>LIBERSKY</sup>, U. Nienke
- 3.2 “A comparative numerical study of pressure-Poisson-equation discretization strategies for SPH”  
J.-P. Fürstenau<sup>LIBERSKY</sup>, B. Avci, P. Wriggers
- 3.3 “A fast incompressible SPH solver for free-surface flows on the GPU”  
A. D. Chow<sup>LIBERSKY</sup>, B. D. Rogers, S. J. Lind, P. K. Stansby

13:40-15:00 **Lunch**

15:00-16:05 **Session 4: WATER WAVES Chair: P. K. Stansby**

- 4.1 “Generation of trains of tsunami-like solitary waves in DualSPHysics model”  
C. Altomare, J. González-Cao, J. M. Domínguez, A. J. C. Crespo, P. Lomonaco, M. Gómez-Gesteira
- 4.2 “SPH Modeling of Short-crested Waves”  
Z. Wei, R. A. Dalrymple
- 4.3 “Numerical modeling of wave propagation in the surf zone and structure-wave interaction using SPH and non-hydrostatic NLSW Equations”  
P. St-Germain, I. Nistor, C. Altomare
- 4.4 “Submerged plate wave energy converter SPH simulations: wave mass transport”  
R. Carmigniani<sup>LIBERSKY</sup>, A. Joly, A. Leroy, D. Violeau

16:05-17:10 **Session 5: COUPLING TO OTHER MODELS Chair: R. A. Dalrymple**

- 5.1 “Applicability of source generation (SG) and absorption technique in a highly reflective condition”  
A. Usui, J. M. Domínguez, T. Suzuki, C. Altomare, B. Tagliafierro
- 5.2 “A non-linear 2-way coupling between DualSPHysics and a wave propagation model”  
T. Verbrughe<sup>LIBERSKY</sup>, A. Kortenhaus, P. Troch, J. M. Domínguez
- 5.3 “DualSPHysics, applications of a HPC multiphysics simulation framework”  
R. B. Canelas, O. García-Feal, J. M. Domínguez, M. Brito, A. J. C. Crespo, R. M. L. Ferreira
- 5.4 “A hybrid incompressible SPH - Finite Element 2-D potential flow solver for non-linear free surface flows”  
G. Fourtakas, P. K. Stansby, B. D. Rogers, S. J. Lind, S. Yan, Q.W. Ma

17:10-17:40 **Coffee**

17:40-18:15 **Discussion Panel: “Do we want SPH to be a fully Lagrangian method (for fluids)?” Chair: A. Souto-Iglesias  
R. Vignjevic, S. J. Lind, X. Hu, D. Le Touzé**

19:30 **Welcome cocktail**

**2nd DAY: JUNE 14 (WEDNESDAY)**

09:00-09:55 **Keynote 2: “Particle Finite Element Method (PFEM)” by Miguel Ángel Celigueta, CIMNE Barcelona.**  
**Chair: C. Altomare**

09:55-11:15 **Session 6: MULTIPHASE FLOW Chair: X. Y. Hu**

- 6.1 “Multiphase modelling of an experimental device for conformal coating of pancreatic islets”  
T. Cazzato, F. Colombo, F. Consolo, A. Redaelli, V. Manzoli, A. Tomei, S. Manenti, S. Sibilla
- 6.2 “Study of two-phase flow at low Reynolds numbers: Extension of contact line dynamics to creeping flow”  
P. Kunz<sup>LIBERSKY</sup>, U. Niesen
- 6.3 “Two Novel Projection-Based Particle Methods for Multiphase Flows with Large Density Ratios and Discontinuous Density Fields”  
A. Khayyer, H. Gotoh, Y. Shimizu, K. W. P. Teng
- 6.4 “Improved elastic-viscoplastic model for SPH simulations of bed-load transport and scouring”  
A. Ghaitanellis<sup>LIBERSKY</sup>, D. Violeau, M. Ferrand, A. Leroy, A. Joly
- 6.5 “Efficient Two-Phase SPH for Accurate Wave Slam on Decks”  
S. J. Lind, Q. Fang, P. K. Stansby, B. D. Rogers, G. Fourtakas

11:15-11:45 **Coffee**

11:45-12:35 **Session 7: NEW APPLICATIONS I Chair: M. De Leffe**

- 7.1 “Numerical Simulation of Laser Melting Additive Manufacturing Processes using SPH”  
M. Russel<sup>LIBERSKY</sup>, A. Souto-Iglesias, T. I. Zohdi
- 7.2 “SPH simulation of Gearbox Lubrication: comparison with experimental results”  
M. Z. Mettichi<sup>LIBERSKY</sup>, Y. Gargouri, P. H. L. Groenenboom
- 7.3 “SPH simulation of single-lip deep-hole drilling processes”  
D. Schnabel<sup>LIBERSKY</sup>, P. Eberhard

12:35-13:40 **Session 8: SOLIDS AND STRUCTURES I Chair: R. Vignjevic**

- 8.1 “Friction modelling in particle-to-particle contact”  
J. C. Campbell, T. De Vuyst, R. Vignjevic, N. Djordjevic, K. Hughes
- 8.2 “SPH-DEM Coupling for Polyhedral Particles”  
I. Kondor<sup>LIBERSKY</sup>, E. Siegmann, R. Scharler, J. G. Khinast
- 8.3 “Simulation of Laser Welding with SPH and a Ray-Tracing Scheme”  
H. Hu, P. Eberhard, F. Fetzer, P. Berger
- 8.4 “A stable solid-liquid multiphase flow simulation by projection-based particle method”  
N. Tsuruta, H. Gotoh, E. Harada, A. Khayyer

13:40-15:00 **Lunch**

15:00-15:50 **Session 9: ALTERNATIVE APPROACHES Chair: D. Le Touzé**

- 9.1 “A hybrid Lagrangian Voronoi-SPH scheme”  
D. Fernández-Gutiérrez, A. Souto-Iglesias, T. I. Zohdi
- 9.2 “Vortex interaction with free-surface by a coupled FV-SPH solver”  
L. Chiron, S. Marrone, A. Di Mascio, D. Le Touzé
- 9.3 “A Multiscale Model for the Simulation of Sediment Impact Erosion of Metallic Targets using the Finite Volume Particle Method”  
S. Leguizamón<sup>LIBERSKY</sup>, E. Jahanbakhsh, A. Maertens, S. Alimirzazadeh, F. Avellan
- 9.4 “Enhancements of the meshless Finite Volume Particle Method (FVPM) for free-surface flows”  
N. J. Quinlan (no presentation)

15:50-16:55 **Session 10: COMPLEX PHYSICS & MISCELANEA Chair: R. Vacondio**

- 10.1 “Rounding of melting particles”  
P. Nair, M. Blank, T. Pöschel
- 10.2 “Implicit integration of the viscous term and GPU implementation in GPUSPH for lava flows”  
V. Zago<sup>LIBERSKY</sup>, G. Bilotta, A. Cappello, R. A. Dalrymple, L. Fortuna, G. Gancia, A. Herault, C. Del Negro
- 10.3 “Comparison of mesh-free and mesh-based numerical methods”  
J. González-Cao, C. Altomare, A. J. C. Crespo, J. M. Domínguez, F. Zhang, M. Gómez-Gesteira
- 10.4 “Viscous flow past a circular cylinder close to a free surface: results from a benchmark between SPH and mesh-based solvers”  
A. Colagrossi, G. Nikolov, P. N. Sun, D. Durante, A. Souto-Iglesias

16:55-17:25 **Coffee**

17:30-18:00 **SC Meeting**

18:00 **Boat cruise**

21:00 **Banquet**

**3rd DAY: JUNE 15 (THURSDAY)**

**09:00-10:10 Session 11: HIGH PERFORMANCE COMPUTING Chair: A. J. C. Crespo**

- 11.1 “GPU-SPHEROS: A GPU-Accelerated Versatile Solver Based on the Finite Volume Particle Method”  
S. Alimirzazadeh<sup>LIBERSKY</sup>, E. Jahanbakhsh, A. Maertens, S. Leguizamón, F. Avellan
- 11.2 “Towards an HPC-based coupling tool for Eulerian-Lagrangian simulations”  
J. M. Zavala-Aké<sup>LIBERSKY</sup>, M. Rivero, D. Mira, M. Vázquez, G. Houzeaux
- 11.3 “HPC Predictions of Primary Atomization with SPH: Validation and Comparison to Experimental Results”  
S. Braun<sup>LIBERSKY</sup>, S. Holz, L. Wieth, T. F. Dauch, M. C. Keller, G. Chaussonnet, C. Schwitzke, R. Koch, H-J. Bauer
- 11.4 “Efficient Particle Ordering with Space-filling Curves for Incompressible Smoothed Particle Hydrodynamics”  
R. Fair, X. Guo, T. Cui

**10:10-11:15 Session 12: ADAPTIVITY & BOUNDARY CONDITIONS Chair: B. D. Rogers**

- 12.1 “A new parallel framework for SPH method with adaptive smoothing-length”  
Z. Ji<sup>LIBERSKY</sup>, L. Fu, X. Y. Hu, N. A. Adams
- 12.2 “An Adaptivity Criterion for Smoothed Particle Hydrodynamics Fluid Simulations Based on Spatial Discretization Error”  
F. Spreng, R. Vacondio, P. Eberhard, J. R. Williams
- 12.3 “Accurate and efficient SPH open boundary conditions for real 3-D engineering problems”  
A. Tafuni, J. M. Domínguez, R. Vacondio, A. J. C. Crespo
- 12.4 “AQUApush: The SPH of the researchers, by the researchers, to the researchers”  
J. L. Cercós-Pita, I. Zisis, J. Calderón-Sánchez, R. Messahel

**11:15-11:45 Coffee**

**11:45-12:35 Session 13: PRE-PROCESSING AND VISUALISATION Chair: J-C. Marongiu**

- 13.1 “Preprocessing Workflow for the Initialization of SPH Predictions based on Arbitrary CAD Models”  
T. F. Dauch<sup>LIBERSKY</sup>, M. Okrashevski, M. C. Keller, S. Braun, L. Wieth, G. Chaussonnet, R. Koch, H-J. Bauer
- 13.2 “SPHStudio: A ParaView based software to develop SPH simulation models”  
C. Sur, B. van Beest
- 13.3 “Graphical User Interface for SPH codes: DesignSPHysics”  
A. Vieira<sup>LIBERSKY</sup>, O. García-Feal, J. M. Domínguez, A. J. C. Crespo, M. Gómez-Gesteira

**12:35-13:40 Session 14: HYDRAULIC APPLICATIONS Chair: A. Colagrossi**

- 14.1 “Solid particle transport in SPH in order to estimate erosion”  
W. Boden<sup>LIBERSKY</sup>, S. Aubert, R. Perkins, J-C. Marongiu
- 14.2 “Numerical Modelling of the Undersluices of the Rance Tidal Power Station with SPH”  
T. Fonty, J. Milla Lopez Asiain, A. Leroy, G. Guyot, D. Violeau, A. Joly
- 14.3 “Forced vibration response of a fluid filled cylindrical container”  
T. De Vuyst, J. C. Campbell, R. Vignjevic, N. Djordjevic, K. Hughes
- 14.4 “Application, modelling and validation of an OWSC using DualSPHysics”  
M. Brito<sup>LIBERSKY</sup>, R. B. Canelas, R. M. L. Ferreira, O. García-Feal, A. J. C. Crespo, J. M. Domínguez, L. Teixeira, M. G. Neves

**13:40-15:00 Lunch**

**15:00-16:05 Session 15: NEW APPLICATIONS II Chair: M. Gómez-Gesteira**

- 15.1 “SPH simulations of Magnetorheological Abrasive Flow Machining at a microscopic scale”  
S. Mohseni-Mofidi, C. Nutto, H. Lagger, C. Bierwisch
- 15.2 “Patient specific systolic blood flow simulations with SPH: modelling and clinical validation”  
O. Amoignon, P. H. L. Groenenboom, A. Kamoulakos
- 15.3 “Integrated Numerical Simulation of Anaerobic Digestion Process Using Smoothed Particle Hydrodynamics”  
M. Rezavand<sup>LIBERSKY</sup>, D. Winkler, W. Rauch
- 15.4 “A single-phase SPH model for evaporation and condensation phenomena”  
J. Calderón-Sánchez<sup>LIBERSKY</sup>, D. Duque, A. Souto-Iglesias

**16:05-16:40 Session 16: SOLIDS AND STRUCTURES II Chair: S. Sibilla**

- 16.1 “Development of solid SPH solver with Fluid-structure interaction within SPHYSICS: Application to cavitation erosion”  
S. Joshi, G. Ghigliotti, J-P. Franc, M. Fivel
- 16.2 “Numerical Simulation of Fracture Propagation in Layered Rock”  
R. Pramanik, K. Pan, B. D. Jones, A. Albaiz, T. Douillet-Grellier, J. R. Williams

**16:40-17:00 Closing & Awards**

**17:53 Train to Madrid (15' to train station)**