

17th SPHERIC International Workshop

Detailed programme

Day 1

Tuesday 27th of June

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

08:45 - 09:00 **Opening**

09:00 - 10:00 **Keynote 1** **Integrating quantum computing with HPC - Viv Kendon** **Chair: Steven Lind**

10:00 - 10:45 **Coffee break**

Session 1 **High-performance computing & algorithms** **Chair: Aaron English**

10:45 - 11:00 1.1 Towards exascale SPH simulations with task-based parallelism: Step I, Effective GPU acceleration A.M.A. Nasar, G. Fourtakas, B. D. Rogers, M. Schaller & R.G. Bower

11:00 - 11:15 1.2 Efficient algebraic multigrid preconditioning of Krylov solvers for an incompressible SPH scheme M. Mihajlović & G.Fourtakas

11:15 - 11:30 1.3 Level-set based mid-surface particle generator for thin structures D. Wu, Y. Yu, C. Zhang, X. Hu & B. Rochlitz

11:30 - 11:45 1.4 Improving particle distribution for SPH complex geometries pre-processing J. Zhang, X. Guo, X. Feng & L. Zhu

Session 2 **Convergence, consistency and stability** **Chair: Salvatore Marrone**

11:50 - 12:05 2.1 Derivation of an improved δ -SPHC model for establishing a three-dimensional numerical wave tank overcoming excessive numerical dissipation H.G. Lyu, P.N. Sun, P.Z. Liu and X.T. Huang & A. Colagrossi

12:05 - 12:20 2.2 Stability and performance of the acoustic terms in WCSPH G. Bilotta, A. Herault, E. Saikali & R.A. Dalrymple

12:20 - 12:35 2.3 A way to increase the convergence-order in SPH J. Michel, A. Colagrossi, D. Le Touze, M. Antuono & S. Marrone

12:35 - 12:50 2.4 An investigation on the divergence cleaning in weakly compressible SPH G. Fourtakas, R. Vacondio & B.D. Rogers

13:00 - 14:30 **Lunch**

Session 3 **Incompressible flows** **Chair: David Le Touzé**

14:30 - 14:45 3.1 Energy conservation in ISPH P.E. Merino-Alonso & D. Violeau

14:45 - 15:00 3.2 An Improved ALSPH Approach for Incompressible Free Surface Flow Simulations D.C. Kolukisa, R. S., Ehsan Khoshbakhthnejad & M. Yildiz

15:00 - 15:15 3.3 Artificial compressibility for smoothed particle hydrodynamics using pressure smoothing J.J. De Courcy, T. Rendall, B. Titurus, L. Constantin & J. E. Cooper

15:15 - 15:30 3.4 Smoothed particle hydrodynamics for modelling void behaviour in composites manufacture C. Wales, S. Anderson, J. Kratz, P. Galvez-Hernandez & T. Rendall

	Session 4	Multiple continua and multi-phase flows	Chair: Chun Hean Lee
15:35 - 15:50	4.1	Modeling of Pore Formation in Deep Penetration Laser Beam Welding Using the SPH Method	D. Sollich & P. Eberhard
15:50 - 16:05	4.2	Interface enhancement with textured surfaces in thin-film flows	K. Vigneshwaran Muthukumar, C. Ates, A. Dull, F. Ohl, T. Haber & O. Deutschmann
16:05 - 16:20	4.3	Exploring Particle Based Modeling of Turbulent Multi-Phase Flow: A Comparative Study of SPH and MFM	M. Wicker, M. Okraschevski, R. Koch & H. J. Bauer
16:20 - 16:35	4.4	An explicit multi-time criteria algorithm for multi-time scale coupling problems in SPH	X. Tang, D. Wu, O. Haidn & X. Hu
16:40 - 17:10	Coffee break		
	Session 5	Free surface and moving boundaries	Chair: Corrado Altomare
17:10 - 17:25	5.1	SPH simulations of sloshing flows close to the critical depth	A. Bardazzi, C. Lugni, D. Durante & A. Colagrossi
17:25 - 17:40	5.2	SPH simulation of three-dimensional resonant viscous sloshing flows	C. Pilloton, J. Michel, A. Colagrossi, S. Marrone & P. Colagrossi
17:40 - 17:55	5.3	Superelevation of Supercritical Flow in Rectangular Channel Bends using SPH	C. van Rees Paccot & L. Zamorano

Day 2

Wednesday 28th of June

08:30 - 09:30	Keynote 2	Smooth Particle Hydrodynamics for fast solid dynamics using first order conservation laws – Antonio Gil	Chair: Tom De Vuyst
	Session 6	Solids and structures	Chair: Xiangyu Hu
09:30 - 09:45	6.1	Modelling elastic structures using SPH: comparison between Riemann-based and diffusive term-based stabilization	C. De Sousa, G. Oger & D. Violeau
09:45 - 10:00	6.2	Simulation of elastoplastic problems using a stress-based acoustic Riemann solver	M. Lallemand, G. Oger, D. Le Touze, M. De Lefre & C. Hermange
10:00 - 10:15	6.3	Study on the hypervelocity impact induced microjet from the grooved metal surface	W. Song
10:15 - 10:30	6.4	A Novel Arbitrary Lagrangian Eulerian SPH Algorithm For Large Strain Explicit Solid Dynamics	C. H. Lee, A. J. Gil, J. Bonet & K. W. Q. Low
10:35 - 11:10	Coffee break		
	Session 7	Complex flows I	Chair: Giuseppe Bilotta
11:10 - 11:25	7.1	A dynamic contact angle based surface tension model accelerated on GPU	C. Cen, G. Fourtakas, S.J. Lind & B.D. Rogers
11:25 - 11:40	7.2	Target-driven PDE-constrained optimization of thermal conductivity distribution based on SPH	B. Zhang, C. Zhang & X. Hu
11:40 - 11:55	7.3	SPH-FSI Modelling of the Heart Valves	S. Laha, G. Fourtakas, P.K. Das & A. Keshmiri

11:55 - 12:10	7.4	Coupling SPH with biokinetic models for anaerobic digestion	P. Kumar, W. Rauch & Z. Yan
	Session 8	Artificial intelligence and machine learning	Chair: Guillaume Oger
12:15 - 12:30	8.1	A Hybrid Framework for Fluid Flow Simulations: Combining SPH with Machine Learning	R. Winchenbach & N. Thuerey
12:30 - 12:45	8.2	How AI can speed up SPH simulations	E. Amato, V. Zago, C. Corradino & C. Del Negro
12:45 - 13:00	8.3	Deep reinforcement learning for performance optimization of oscillating wave surge converter	M. Ye, X. Hu & C. Zhang
13:05 - 14:35	Lunch		
	Session 9	Adaptivity & variable resolution	Chair: Prapanch Nair
14:35 - 14:50	9.1	A variable resolution SPH scheme based on independent domains coupling	F. Ricci, R. Vacondio & A. Tafuni
14:50 - 15:05	9.2	Multi-Resolution Approach for Multiphase Flows	N. Burkle, M. Okraschevski, R. Koch & H.J. Bauer
15:05 - 15:20	9.3	Multi-Phase SPH with Adaptive Particle Refinement on a GPU	R. Suri, B.D. Rogers & P.K. Stansby
	Session 10	Boundary conditions	Chair: Abouzed Nasar
15:25 - 15:40	10.1	Accurate laser powder bed fusion modelling using ISPH	C. Bierwisch, B. Diemann & T. Najuch
15:40 - 15:55	10.2	A way to improve the ghost-particle technique: the clone particles	M. Antuono, C. Pilloton, A. Colagrossi & D. Durante
15:55 - 16:10	10.3	The effect of baffles on the heat transfer through interface under different sloshing conditions	Y. Yu, Y. Wu, O.J. Haidn, C. Manfretti & X. Hu

Day 3

Thursday 29th of June

09:30-10:30	Keynote 3	History of particle shifting and future wave structure interaction – Peter Stansby	Chair: Nathan Quinlan
10:30-11:00	Coffee break		
	Session 11	Hydraulic applications	Chair: Pablo Merino Alonso
11:00-11:15	11.1	Developments and application of an offline coupling for armor block breakwaters on impermeable bed	B. Tagliaferro, C. Altomare, A. Sánchez-Arcilla, J.M. Domínguez, A. Crespo & M. Gómez-Gesteira
11:15-11:30	11.2	Flow regimes in sluice gate-weir systems: 3D SPH-based model validation	E Chatzoglou & A. Liakopoulos
11:30-11:45	11.3	Reconstruction of 3D floating body motion on shallow water flows	B. Havasi-Toth
11:45-12:00	11.4	Characterization of free-surface damping in horizontally excited tanks	M. D. Green, O. Debarre, K. Kotsarini, A. Simonini & A. Tafuni

	Session 12	Geotechnical & disaster applications	Chair: Stefano Sibilla
12:05-12:20	12.1	Coupled FVM-SPH model for sub-aerial and submerged granular flows	N.U.H. Bhat & G. Pahar
12:20-12:35	12.2	Coupled flow-deformation problems in porous materials in SPH	R. Feng, G. Fourtakas, B.D. Rogers & D. Lombardi
12:35-12:50	12.3	Modeling Landslide induced Tsunamis through Coupled ISPH	N.U.H. Bhat & G. Pahar
13:00-14:30	Lunch		
	Session 13	Process & manufacturing engineering applications	Chair: Matthieu de Lefte
14:30-14:45	13.1	Investigation of Chip Jamming in Deep-Hole Drilling	A. Baumann & P. Eberhard
14:45-15:00	13.2	Oil-Jet Lubrication of Epicyclic Gear Trains	M. Haber, C. Schwitzke & H.J. Bauer
15:00-15:15	13.3	Practical guidelines on modelling electric engine cooling with SPH	G.A. Mensah, P. Sabrowski & T.B. Wybranietz
15:15-15:30	13.4	Simulation of Impinging Jet Cooling of E-Motors using SPH	L. Wendling, S. Joshi & M. Gissler
	Session 14	Complex flows II	Chair: Thomas Rendall
15:35-15:50	14.1	A Integral-based Approach for the Vector Potential in Smoothed Particle Magnetohydrodynamics	T.S. Tricco & D.J. Price
15:50-16:05	14.2	Numerical Analysis of the Viscoelastic Flow Problems by a Semi-Implicit Characteristic Generalized Particle Methods	D. Tagami
16:05-16:20	14.3	Axisymmetric FVPM simulations of primary droplet formation in a vibrating-mesh nebuliser	M. Hassanzadeh Moghimi, J.A. Monterrubio Lopez, C. Guy, G. O'Connor, R. MacLoughlin, N. Smith & N. J. Quinlan
16:20-16:35	14.4	Extensional flow in a liquid bridge between pinned substrates	S. K. Nayak, M.B. Blank & P. Nair
16:50-17:20	Closing and awards		