

VIII International Conference on Particle-Based Methods Technical Programme

Monday, 09/10/2023

Mon, 09/10/2023 08:00 - 09:30
Registration and Check in

Palazzo delle Stelline

Mon, 09/10/2023 09:30 - 10:00
Opening ceremony

Room Volta

Mon, 09/10/2023 10:00 - 10:45
Plenary Lecture - Ken Kamrin
Chaired by: Prof. Ferdinando Auricchio (University of Pavia)

Room Volta

Continuum Granular Flow Modeling and Beyond: Exploiting Meshless Methods
K. Kamrin*

Mon, 09/10/2023 10:45 - 11:15
Coffee Break

Palazzo delle Stelline

Mon, 09/10/2023 11:15 - 13:15
IS01 - Discrete and Particle Methods in Solid and Structural Mechanics I
Organized by: Eduardo M. B. Campello, Liang-Yee Cheng and A. Gay Neto
Chaired by: Prof. Eduardo de Moraes Barreto Campello (University of São Paulo)

Room Volta

Particle-based fiber models of woven materials for earth entry thermal protection **Keynote**

A. Santos*, L. Abbott, J. Haskins

A Discrete Element Analysis of the Mechanical Behaviour of an Electrode Active Layer

A. Lundkvist*, P. Larsson, E. Olsson

Modeling and Simulation of Soil and Soil-Tool Interaction for Industrial Applications

M. Harutyunyan, **S. Emmerich***, S. Steidel, M. Burger, K. Jareteg, J. Quist

A Novel Parallelisation Scheme for DEM on Distributed Memory Computers

E. De Staercke, C. Nougier-Lehon, **F. Froilo***

Fast Point-To-Mesh Distance Computation Technique Based On Cell Linked List For Polygon-Wall Boundary In Moving Particle Semi-Implicit Method

M. Teixeira*, L. Pereira, R. Amaro Jr, L. Cheng

Mon, 09/10/2023 11:15 - 13:15
IS15 - Advances of Particle Shape and Scale in DEM Enabled by GPU/HPC Computing I
Organized by: N. Govender, D. Wilke and J. Rimmelfgass
Chaired by: Prof. Nicolin Govender (RCPE)

Room Solari

DEM in Industry: Its Growth and Acceptance **Keynote**

L. Del Cid*

Optimization of a Jaw Crusher Using DEM

M. Sousani*

The Influence of the Particle Shape on the Discharge Rate from the Model Silo

R. Kobylika*, J. Horabik, N. Govender, J. Khinast

Effect of particle size, shape and density differences on binary mixture segregation during blast furnace charging

R. Roepial*, Y. Pang, D. Schott

Particle shape effects in granular material using GPU DEM: An industry perspective

N. Govender*, J. Khinast

Mon, 09/10/2023 11:15 - 13:15
IS23 - Multiphysics and Coupled Modelling with Particle Methods I
Organized by: J. Rojek and T. Zohdi
Chaired by: Prof. Jerzy Rojek (Polish Academy of Sciences)

Room Manzoni

A Formal Mathematical Definition of Particle Methods Bridges the Gap between Discrete and Continuous Simulation **Keynote**

J. Pahlke*, I. Sbalzarini

Scaling Pairwise Force Modelling of Surface Tension Toward Capillary Microbot Simulator

A. Barbot*

MESHFREE simulations in spray cleaning: from full 3D model to reduced liquid layer model

I. Michel*, B. Bock-Marbach, M. Joppa

Integral surface tension model for 2-dimensional flows simulated using smoothed particle hydrodynamics

M. Majda*, P. Rastelli

Model Adaptivity for Fluid Flow Simulations using Meshfree Methods

P. Suchde*

Mon, 09/10/2023 11:15 - 13:15

Room Porta

IS04 - Industrial Application of DEM & CFD-DEM I

Organized by: R. Weiler, C. Goniva and C. Kloss

Chaired by: Dr. Rouven Weiler (BASF SE)

From Geotechnics to Industry and back: An overview of industrial DEM and CFD-DEM Modelling of Particle and Fluid-Particle applications **Keynote**

C. Kloss, **A. Moura***, R. Togni, A. König, G. Viciconte, C. Goniva

CFD-DEM Simulations of Iron Ore Reduction

D. Quetschiner*, T. Lichtenegger, S. Pirker

Discrete Element Modelling for Dosing Operation - Material Calibration and Validation

T. Forgber*, L. Orefice, J. Remmelgas, A. Dobrowolski, R. Sivanapillai, J. Khinast

Effect of Operating Parameters on Powder Mixing in Horizontal Stirred Bed Reactors using Discrete Particle Method

S. Pourandi*, T. Weinhart, I. Ostanin, S. Luding, A. Thornton

Numerical Investigation of a Granular-based Gripper

N. Dierks*, C. Wacker, H. Zetzener, C. Schilde, K. Dröder, A. Kwade

Mon, 09/10/2023 11:15 - 13:15

Room Verdi

IS12 - Computational Modeling of Manufacturing Processes Using Particle and Meshless Methods I

Organized by: J. Carbonell, E. Fernandez-Sanchez, J. Rodriguez and J. Ponthot

Chaired by: Dr. Josep Maria Carbonell (CIMNE)

Comparison of a powder mixing process inside two different blender using DEM

P. Böhling*, J. Remmelgas, M. Salehi, J. Poms, M. Berreta, M. Bautista, J. Khinast, E. Gavi

Computationally efficient boundary representation for the particle-scale simulation of a centrifugal filter

D. Serper*, K. Hanley, P. Oinas

Calibration of AM powders for Optimization of Recoating Applications using DEM

N. Sani*, J. Quist, K. Jareteg, A. Bilock, L. Cordova, E. Hryha, F. Edelvik

DEM Simulation of Powder Bed Spreading for Additive Manufacturing of Functionally Graded Components

S. Choudhury, **R. Annabattula***, M. Amirthalingam

A Numerical Study on the Influence of Cohesive Non-Spherical Powders on the Powder Bed Quality in Additive Manufacturing

S. Jaggannagari*, R. Annabattula, Y. Gan

Mon, 09/10/2023 11:15 - 13:15

Room Borromeo

IS07 - The Material Point Method – Recent Advances I

Organized by: Z. Chen and X. Zhang

Chaired by: Prof. Zhen Chen (University of Missouri), Dr. Duan Zhang (Los Alamos National Laboratory)

Recently Encountered Issues and Solutions in the Applications of Material Point Methods **Keynote**

D. Zhang*, J. Waters, K. Perez, P. Barclay

An Explicit Phase-Field Material Point Method for Dynamic Brittle Fracture Problem

Z. Zeng*, X. Zhang

Understanding Multiscale Interfacial Effects on Architected Composite Responses to Impact Loading with Particle Methods

Z. CHEN*

Development of an implicit cell-based material point method

J. Song*, H. Kim

Mon, 09/10/2023 11:15 - 13:15

Room Toscanini

IS08 - Multiscale Modelling of Complex Fluids Using Particle-Based Methods I

Organized by: N. Moreno, F. Balboa Usabiaga and M. Ellero

Chaired by: Dr. Nicolas Moreno (Basque Center for Applied Mathematics)

Simulating Plastic Flow Deformation of Wood with Moving Particle Hydrodynamics (MPH) method

M. Kondo*, M. Abe, M. Seki, T. Miki, J. Matsumoto

Simulation of Mixing Flows using Particle Exchange Technique in Moving Particle Semi-implicit Method

Y. Imakire*, T. Matsunaga, S. Koshizuka, K. Yamauchi, E. Takeda, K. Takenaka, Y. Ishiba, E. Miyasaka, Y. Kikuchi

Spray Water Flow Analysis based on MPS Method

N. Yamasaki*, T. Tsutsumi

Incompressible-compressible Flows with Boiling and Condensation Phase Change Using Meshless Particle Methods

P. Han*, H. Cong, Q. Liu, Z. Sun, G. Xi

Simulation of Jetting Spray by Moving Particle Semi-implicit Method with Adaptive Particle Resolution

Z. Zhou*, L. Cui, J. Kang, Y. SUN, Y. Zhang, Z. SUN

Mon, 09/10/2023 13:15 - 14:15

Palazzo delle Stelline

Lunch Break

Mon, 09/10/2023 14:15 - 16:15

Room Volta

IS01 - Discrete and Particle Methods in Solid and Structural Mechanics II

Organized by: Eduardo M. B. Campello, Liang-Yee Cheng and A. Gay Neto

Chaired by: Prof. Eduardo de Morais Barreto Campello (University of São Paulo)

Experimental and Numerical Studies on the Efficiency of Damping upon Horizontal Stirring of Granular Materials

K. Ishizeki, **M. Saeki***

Investigation of Dynamic Characteristics of Rolling-Ball Dampers

K. Nagashima*, M. Saeki

3D DEM Analysis of Interface Behavior Between Sand and Corrugated Surfaces

A. Grabowski*, M. Nitka

Improving asphalt discrete numerical modelling with realistic particle shapes

R. Micaelo*, N. Monteiro Azevedo, G. Câmara

Contact Detection Algorithm for Convex NURBS Particles

M. Craveiro*, A. Gay Neto, P. Wriggers

Mon, 09/10/2023 14:15 - 16:15

Room Solari

IS15 - Advances of Particle Shape and Scale in DEM Enabled by GPU/HPC Computing II

Organized by: N. Govender, D. Wilke and J. Remmelgas

Chaired by: Prof. Nicolin Govender (RCPE)

GPU and CPU based Discrete Element Method (DEM) model for Parametric Analysis of Paddle Mixers

J. Emmerink, A. Hadi, J. Jovanova, C. Cleven, **D. Schott***

ISPH with a Geometric Multigrid Preconditioning Solver using Background Cells in GPU environment

H. Osaki*, D. Morikawa, M. Asai

Beyond the Black Box: How GPU & HPC Computing Give a New Approach to Vertical Stirred Milling

D. Rhymer*, A. Ingram, K. Windows-Yule

How the Packing Density and Penetration Resistance is Influenced by Particle Shape: DEM Modelling of Plate Penetration in Granular Media

G. van Selm*, M. Mohajeri, H. Shi, D. Schott

Advances in Discrete Element Modelling using GPUs

H. Kureck*, S. Enzinger, R. Stangl, M. Rupp, N. Govender

Mon, 09/10/2023 14:15 - 16:15

Room Manzoni

IS23 - Multiphysics and Coupled Modelling with Particle Methods II

Organized by: J. Rojek and T. Zohdi

Chaired by: Prof. Jerzy Rojek (Polish Academy of Sciences)

Generalized Particle-Continuum Coupling Methods for Multi-Physical Processes in Granular Materials **Keynote**

H. Cheng*, J. E. Alvarez Naranjo, S. Luding, A. L. Hazel, T. Weinhart

Investigation on Acceleration Method of Grid-Particle Coupling Simulation for SLD Icing

Y. Abe*, M. Kaneshi, K. Fukudome, S. Fujimura, M. Yamamoto

Multi-shot Icing Simulation on NACA0012 Airfoil under Glaze Ice Condition by Hybrid Grid- and Particle-based Method

M. Kaneshi*, Y. Abe, K. Fukudome, S. Fujimura, M. Yamamoto

Mesh-free particle methods for ice dynamics

A. Shakibaeinia*

Coupling of the Boundary and Discrete Element Methods for Simulating Dynamic Problems

G. Barros*, A. Pereira, J. Rojek, K. Thoeni

Mon, 09/10/2023 14:15 - 16:15

Room Porta

IS04 - Industrial Application of DEM & CFD-DEM II

Organized by: R. Weiler, C. Goniva and C. Kloss

Chaired by: Dr. Rouven Weiler (BASF SE)

Coupled simulation of a regrind mill using the discrete element method: Calibration of the bulk material behaviour

R. Probst*, D. von Känel

Numerical Modeling of Load Behavior in Ball Mills: Scale Effects and Copper Ore Grinding Efficiency

B. Doroszuk*, R. Król

A Discrete Element Study of Shear Bonding Between Asphalt Layers

E. Olsson*, D. Jelagin, C. Raab, M. Partl

Simulation of a Vibrational Powder Transport System using the Discrete Element Method

M. Trogrlic*, D. Jajcevic, J. Khinast, P. Doshi, B. Ager, R. Tata Venkata, S. Franklin, D. Barling

Mon, 09/10/2023 14:15 - 16:15

Room Verdi

IS12 - Computational Modeling of Manufacturing Processes Using Particle and Meshless Methods II

Organized by: J. Carbonell, E. Fernandez-Sanchez, J. Rodríguez and J. Ponthot

Chaired by: Dr. Josep Maria Carbonell (CIMNE)

A Coupled Discrete Element and Incompressible Smoothed Particle Hydrodynamics Approach to Efficiently Simulate Laser Metal Deposition Processes

Keynote

C. Weißenfels*, X. Tang, P. Wriggers

Investigation of the Dynamics of Selective Laser Melting (SLM) in Powder-Based Additive Manufacturing Using a Hybrid VOF-DEM Approach

O. Ejtahadi*, S. Haeri

A holistic simulation chain for the laser powder bed fusion process for metals at particle scale

S. Mohseni-Mofidi*, B. Dietemann, T. Najuch, A. Butz, C. Bierwisch

Comparison of Incompressible and Weakly-Compressible SPH for the Simulation of Laser Beam Welding

D. Sollich*, P. Eberhard

Three-dimensional numerical simulation of slag formation and transfer processes in metal active gas welding using incompressible smoothed particle hydrodynamics method

H. Komen*, T. Fukazawa, M. Shigeta, M. Tanaka, T. Yamada, N. Saito, M. Fukahori

Mon, 09/10/2023 14:15 - 16:15

Room Borromeo

IS07 - The Material Point Method – Recent Advances II

Organized by: Z. Chen and X. Zhang

Chaired by: Prof. Yonggang Zheng (Dalian University), Prof. Martin Berzins (University of Utah)

Computational Error Estimation for the Material Point Method in 1D and 2D

M. Berzins*

Extraction of Lagrangian Coherent Structures in the framework of the Lagrangian-Eulerian stabilized collocation method (LESCM)

Z. Qian*, M. Liu, L. Wang

Effectiveness and limitations of Taylor particle-in-cell transfer and kernel correction for material point method

K. Nakamura*

Simulation of Dynamic Compaction with Granular Material Point Method

Y. MA*, M. Debasis, S. Wojciech

Virtual stress boundary method to impose nonconforming Neumann boundary condition

Y. Liang*, J. Given, B. Chandra, X. Zhang, K. Soga

Mon, 09/10/2023 14:15 - 16:15

Room Toscanini

IS08 - Multiscale Modelling of Complex Fluids Using Particle-Based Methods II

Organized by: N. Moreno, F. Balboa Usabiaga and M. Ellero
Chaired by: Dr. Nicolas Moreno (Basque Center for Applied Mathematics)

A Scalable Hybrid Particle-Mesh Method for Simulating Active Fluids in Three Dimensions

A. Singh*, P. Suhrcke, P. Incardona, I. Sbalzarini

Turbulence modelling for meshfree collocation methods

M. Padmanabha*, J. Kuhnert, N. Gauger, P. Suchde

A Fully Lagrangian Particle Level-Set Method for the Simulation of Dynamic Surfaces

L. Schulze*, S. Veettil, I. Sbalzarini

A Continuous Particle Method for Simulations of Active Fluids on Curved Surfaces

A. Foggia*, A. Singh, P. Incardona, I. Sbalzarini

Heterogeneous Multiscale Modelling of Biological Fluids using Smoothed Dissipative Particle Dynamics

N. Moreno*, M. Ellero

Mon, 09/10/2023 16:15 - 16:45

Palazzo delle Stelline

Coffee Break

Mon, 09/10/2023 16:45 - 18:45

Room Volta

IS01 - Discrete and Particle Methods in Solid and Structural Mechanics III

Organized by: Eduardo M. B. Campello, Liang-Yee Cheng and A. Gay Neto
Chaired by: Prof. Eduardo de Moraes Barreto Campello (University of São Paulo)

DEM-BPM modelling of coated particles to investigate their crash absorbing behaviour

W. Safdar*, S. Heinrich, A. Düster

Advanced Structure Modelling Using the Bonded-Particle Method: Enabling Complex Capabilities for Structures in DEM Simulations

E. Fimbinger*

Parametric Physics-Informed Neural Networks for Material Model Calibration from Full-Field Displacement Data

D. Anton*, H. Wessels

Discrete element method for combination of continuous and partial problems

R. Varga*

A methodology for the prediction of bulk properties of granular materials using deep learning

O. Quintana Ruiz*, E. de Moraes Barreto Campello

Finite strain elastoplastic and solid-solid contact problems with the Smoothed Particle Hydrodynamics

D. Morikawa*, M. Asai

Mon, 09/10/2023 16:45 - 18:45

Room Solari

IS03 - Granular Plasticity I

Organized by: F. Nicot, A. Wautier and F. Darve
Chaired by: Prof. Nicot Francois (INRAE)

Structural and Property Changes in Granular Materials Subjected to Thermal Cycling Keynote

A. Rotta Loria*, Y. Pan, J. Coulibaly

Failure of Cohesive Granular Columns: Friction and Contact Adhesion

L. STARON*, L. DUCHEMIN, P. LAGREE

Effects of Segregation on the Rheology of Granular Materials Subjected to Triaxial Loading

V. Pola*, R. Annabattula

A Multiscale Approach for Constitutive Modelling of Snow

M. Miot*, A. Wautier, P. Polfer, F. Nicot, P. Philippe, T. Fulp

Mon, 09/10/2023 16:45 - 18:45

Room Manzoni

IS23 - Multiphysics and Coupled Modelling with Particle Methods III

Organized by: J. Rojek and T. Zohdi
Chaired by: Prof. Jerzy Rojek (Polish Academy of Sciences)

Coupled Thermo-electrical Discrete Element Model of Electric Current Activated/Assisted Sintering

J. Rojek*, F. Nisar, S. Nosewicz, M. Chmielewski, K. Kaszyca

Skin Layer Formation in Plate Model for Coupled Analysis of Injection Molding Process of Bonded Magnets

Y. Uematsu*, K. Hirata, F. Miyasaka, T. Kitamura, T. Kikugawa

A Stabilized and Coupled Axisymmetric Non-Ordinary State Based Peridynamics Model for Ablation and Plastic Fracture in Reactor Accident

H. Zhang*, Z. Liu, C. Li, Z. Cai, H. Ye, H. Zhang, Y. Zheng

Numerical Simulation of Solidification of a Single Molten Droplet by Multi-Resolution Moving Particle Simulation Method Incorporating Particle Shifting Scheme

S. Kato*, K. Fukudome, S. Fujimura, M. Yamamoto

Unresolved FEM-DEM model for heated immersed granular flows

M. Henry*, S. Dorbolo, J. Lambrechts, V. Legat

Non-Fourier heat conduction with phase change using Hyperbolic Lattice Boltzmann Method by modifying the Equilibrium distribution function

S. Srivastava*, P. Mariappan

Mon, 09/10/2023 16:45 - 18:45

Room Porta

IS04 - Industrial Application of DEM & CFD-DEM III

Organized by: R. Weiler, C. Goniva and C. Kloss
Chaired by: Dr. Rouven Weiler (BASF SE)

The Next-Generation of Powder and Particle Characterisation Tools

B. Jenkins*, A. Nucuşan, G. Lumay, A. Neveu, F. Francqui, J. Seville, K. Windows-Yule

Future-proof: Hardware agnostic DEM Simulations using Aspherix

A. Mayrhofer*, M. Kwakkel, B. Füvesi, C. Goniva, C. Kloss

Combining Machine Learning and DEM Simulations for the Optimization of Industrial Bulk Solids Handling Processes – a Case Study on Bin Blending

S. Pantaleev*, L. Mariano, C. Labra

Efficient and Scalable GPU-oriented SPH Solver: A Real Application Study

V. Daroz*, R. Bharadwaj, A. Potapov, E. Wohlers, A. Bortoletto

Modeling Air Filtration Phenomena using Fully-Resolved and Unresolved CFD-DEM Simulations

J. Wieremiejczuk*, C. Mehring

Mon, 09/10/2023 16:45 - 18:45

Room Verdi

IS12 - Computational Modeling of Manufacturing Processes Using Particle and Meshless Methods III

Organized by: J. Carbonell, E. Fernandez-Sanchez, J. Rodriguez and J. Ponthot

Chaired by: Dr. Josep Maria Carbonell (CIMNE)

Computational Modeling of Cold Spray Process Using Particle-based Methods

J. Qi*, R. Raelison, J. Li, M. Rachik

Performance and Accuracy Limitations in Weakly Compressible SPH

F. Thiery*, S. Adami, N. Adams

Modelling Shrinkage and Neck Evolution in Sintered Astaloy® 85 Mo Powder

V. Gaisina*, P. Larsson

Examination of Variable Tilting Speed on Flow Behaviour during Ladle Pouring in Die Casting using SPH Simulation

F. Itakura*, T. Yamada, Y. Maeda, A. Hasuno, Y. Mochida

Particle-based Flow Simulation of Molten Aluminum Alloy Through Casting Filters

T. Deguchi*, K. Taki, Y. Maeda

Mon, 09/10/2023 16:45 - 18:45

Room Borromeo

IS07 - The Material Point Method – Recent Advances III

Organized by: Z. Chen and X. Zhang

Chaired by: Prof. Tommy Sewell (University of Missouri), Dr. Yosuke Higo (Kyoto University)

Footing Penetration Simulation using a Full-Integration Technique for Material Point Method with CPDI2

Y. Higo*, Y. Takegawa, T. Kiriya

a Virtual Particle Domain Interpolation for Material Point Method

Y. Jiang*

Stabilized mixed formulation for incompressible materials by using VMS in a Material Point Method framework

L. Moreno*, A. Larese, R. Wüchner

MD-Informed Material Point Method Study of Shock-Induced Pore Collapse in an Explosive Crystal

T. Sewell*

GPUs Based Material Point Method for Compressible Flows

P. Baioni*, T. Benacchio, L. Capone, C. de Falco

Mon, 09/10/2023 16:45 - 18:45

Room Toscanini

IS08 - Multiscale Modelling of Complex Fluids Using Particle-Based Methods III

Organized by: N. Moreno, F. Balboa Usabiaga and M. Ellero

Chaired by: Dr. Nicolas Moreno (Basque Center for Applied Mathematics)

An exact sharp-interface model for simulating gas-liquid two-phase flow based on an enhanced moving particle semi-implicit method

G. Duan*, M. Sakai

Examining the Impact of Interparticle Forces on the Rheological Behavior of Micro Particle Suspensions with Unresolved Coupled CFD-DEM Simulations

D. Ivanov*, M. Eslami Pirharati, I. Mai, C. Schilde

Smoothed-Particle Hydrodynamics simulations of viscoelastic integral fractional models

L. Santelli*, A. Vázquez-Quesada, M. Ellero

Smoothed Particle Hydrodynamic Study of Discontinuous Shear Thickening

P. Angerman*, B. Sandnes, S. Prasanna-Kumar, R. Seto, M. Ellero

Mon, 09/10/2023 19:00 - 20:30

Palazzo delle Stelline

Welcome Cocktail

Tuesday, 10/10/2023

Tue, 10/10/2023 09:00 - 11:00

Room Volta

Semi Plenary Lectures I - W. Sun, J. Gaume and G. Cusatis

Chaired by: Prof. Antonia Larese (University of Padua)

Geometric machine learning for particle mechanics

W. Sun*

Particle-based methods for the initiation and dynamics of alpine mass movements.

J. Gaume*

Lattice Discrete Particle Modeling of heterogeneous quasi-brittle materials: a reflection on two decades of accomplishments

G. Cusatis*

Tue, 10/10/2023 09:00 - 11:00

Room Manzoni

Semi Plenary Lectures II - V. Magnanimo, H. Bui and B. Rogers

Chaired by: Prof. Seiichi Koshizuka (The University of Tokyo)

Micromechanical modelling of soils: from sand down to clays

V. Magnanimo*

Particle-based methods for multiscale modelling of internal erosion: from micromechanics to continuum and failure predictions

H. Bui*

Preparing Particle Methods for the ExaScale Computing Revolution

B. Rogers*

Tue, 10/10/2023 11:00 - 11:30

Palazzo delle Stelline

Coffee Break

Tue, 10/10/2023 11:30 - 13:30

Room Volta

IS01 - Discrete and Particle Methods in Solid and Structural Mechanics IV

Organized by: Eduardo M. B. Campello, Liang-Yee Cheng and A. Gay Neto

Chaired by: Prof. Eduardo de Moraes Barreto Campello (University of São Paulo)

SPH modeling of advanced materials in hypervelocity impact simulations

A. Cherniaev*, A. Gudisey

Comparative Study of Methods to Generate C^2 Continuous Mesh-free Basis using the Moving Least Squares Method

G. Bridhani*, U. Saravanan

On the Development of Lattice-Boltzmann Methods for Solid Mechanics

H. Müller*, A. Schlüter, E. Faust, F. Steinmetz, R. Müller

Modeling of material discontinuity in gradient elasticity by using staggered mixed meshless collocation approach

B. Jalušić*, T. Jarak, J. Sorić

Multiphase LDPM-P Model

J. Vozáb*, J. Vorel

Tue, 10/10/2023 11:30 - 13:30

Room Solari

IS03 - Granular Plasticity II

Organized by: F. Nicot, A. Wautier and F. Darve

Chaired by: Prof. Nicot Francois (INRAE)

Critical state as an emerging property multiscale modeling of granular materials

A. Wautier*, N. Deng, Z. Liu, F. Nicot

A two-scale continuum constitutive modelling approach for predictions of fatigue-induced damage in cemented granular materials

V. Le, **H. Bui***, G. Nguyen

Multiphase LBM-DEM Coupling for Unsaturated Granular Media

N. Younes*, R. Wan, O. Millet, A. Wautier, F. Nicot

DEM model for the extrusion of dense cohesive granular flows

S. Yans*, J. Lambrechts, V. Legat

A micromechanical model of PVC geomembranes using a Discrete Element Method

N. Akel, G. Stoltz, A. Wautier, N. Touze, **F. Nicot***

Exploring particle roughness and anisotropy effect in direct shear loading

C. Couture*, D. Takano

Tue, 10/10/2023 11:30 - 13:30

Room Manzoni

IS23 - Multiphysics and Coupled Modelling with Particle Methods IV

Organized by: J. Rojek and T. Zohdi

Chaired by: Prof. Jerzy Rojek (Polish Academy of Sciences)

Random Dense Packing of Continuous Distributions of Non-Spherical Particles – Use of Particle Packing Model and Discrete-Particle-Method to Predict

Particle Spacing Factors

T. Stengel, **F. Wiese***, N. Obermeier

Capillary Pressure Prediction in Partially Saturated Granular Materials with Multicomponent Lattice Boltzmann Method

S. Joseph*, H. Cheng, J. Harting, S. Luding, V. Magnanimo

State-Based Peridynamic Approach for Modelling Particle Motion in Oscillatory Channel Flow with Flexible Leaflets

S. Davidson*, Y. Zhang, Y. Zhang, S. Haeri

Numerical Simulation of Ice Particle Impingement on Wall with Liquid Water Film Using Particle Method

T. Keira*, K. Fukudome, S. Fujimura, M. Yamamoto

Numerical analysis of movement of wave-dissipating blocks caused by water waves using a multi-resolution particle method

H. Sekine*, K. Shibata, K. Takahashi, H. Sanuki, K. Nagai, T. Mizuno, T. Nishihata

Numerical analysis of liquid ring pump by the MPS method

T. Kaito*, K. Shibata, T. Takanashi, N. Yasuda

Tue, 10/10/2023 11:30 - 13:30

Room Porta

IS17 - Recent Advances and Applications of the Particle Finite Element Method (PFEM) I

Organized by: A. Franci and J. Gimenez

Chaired by: Dr. Alessandro Franci (CIMNE/UPC,)

Stabilized node integration in the smoothed particle finite element method: verification and application Keynote

W. Yuan*, M. Liu, W. Zhang

An implicit nodal integration-based PFEM for dynamic analysis of saturated porous media

L. Wang*, X. Zhang, Q. Lei

Combining an a Priori Space-Time Separated Model-Order Reduction Technique to the Particle Finite Element Method

M. Beckermann*, A. Barbarulo, M. Cremonesi

A coupled approach to the large scale simulation of incompressible flows

A. Montanino*, A. Franci, M. Masò, I. de-Pouplana, G. Zuccaro

A Mesh Optimized Explicit Lagrangian Approach for Free-surface Fluid Modelling by Combining PFEM and VEM

C. Fu*, M. Cremonesi, U. Perego, B. Hudobivnik, P. Wriggers

Tue, 10/10/2023 11:30 - 13:30

Room Verdi

IS12 - Computational Modeling of Manufacturing Processes Using Particle and Meshless Methods IV

Organized by: J. Carbonell, E. Fernandez-Sanchez, J. Rodriguez and J. Ponthot

Chaired by: Dr. Josep Maria Carbonell (CIMNE)

Advances in the numerical simulation of machining processes using the PFEM

J. Rodríguez Prieto*, S. Larsson, J. Carbonell

Modelling of Vibration Assisted Machining using the PFEM

J. Carbonell*, H. Bakhshan, E. Oñate

A PFEM approach to model shear cutting of high strength steel sheets

O. Sandin*, J. Rodríguez Prieto, S. Hammarberg, D. Casellas

Modelling 3D Concrete Printing via Particle Finite Element Method

G. Rizzieri*, L. Ferrara, M. Cremonesi

A parallel feature-preserving particle generation method for arbitrarily complex objects

Z. Nie*, X. Yang, Y. Dai, Q. Wang, Z. Ji

Tue, 10/10/2023 11:30 - 13:30

Room Borromeo

IS26 - Advances in Particle-Scale Perspectives in Multiphysics Particle Systems I

Organized by: D. Wilke, P. Pizette and J. Joubert

Chaired by: Dr. Patrick Pizette (IMT Nord Europe)

A Macro-Meso-Microscale Meshless Model for Multiphysics Particle-Laden Flows

J. Joubert*, D. Wilke, P. Pizette

Improvement of ISPH-DEM Coupling Simulator Using SPH(2)

Y. Saeki*, S. Fujioka, K. Tsuji, M. Asai

Particle-based Semi-resolved Coupling Model for the Simulation of Internal Erosion in soil structures

K. Tsuji*, M. Asai, K. Kasama

Coupled DEM-SPH particle-fluid validation of erosion dynamics

P. Pizette*, J. Joubert, D. Wilke

Discrete Element Method to simulate the thermo-mechanical behavior of plasma-sprayed thermal barrier coatings during a thermal cycle

I. Bensemmane*, W. Leclerc, N. Ferguen, M. Guessasma

Tue, 10/10/2023 11:30 - 13:30

Room Toscanini

IS14 - Particle-Based Methods for Natural Hazards Simulation I

Organized by: M. Cremonesi, J. Gaume and A. Larese

Chaired by: Prof. Johan Gaume (ETH Zürich), Prof. Antonia Larese (University of Padua)

Partitioned Coupling Approaches for the Simulation of Natural Hazards Impacting Protective Structures Keynote

V. Singer*, K. Sautter, A. Larese, R. Wüchner, K. Bletzinger

Semi-Implicit MPM for Seepage Failure Analysis

S. Hidano*, Y. Yamaguchi, S. Takase, S. Moriguchi, K. Kaneko, K. Terada

Double-scale MPMxDEM modelling of snowpack deformation and failure

O. Ozenda*, G. Chambon, V. Richefeu

Three-dimensional analysis of rainfall-induced landslide using coupled hydromechanical MPM with implicit and explicit formulations

Y. Yamaguchi*, F. Makinoshima, Y. Oishi

Towards the modelling of tree uprooting during granular-flow-forest interactions: MPM-LSDEM

Z. LIANG*, J. Choo, Y. Zhao, Y. Jiang, C. Choi

Tue, 10/10/2023 13:30 - 14:40

Palazzo delle Stelline

Lunch Break

Tue, 10/10/2023 14:40 - 15:20

Room Volta

IS01 - Discrete and Particle Methods in Solid and Structural Mechanics V

Organized by: Eduardo M. B. Campello, Liang-Yee Cheng and A. Gay Neto

Chaired by: Prof. Eduardo de Morais Barreto Campello (University of São Paulo)

Particle-based Simulation of Crack Propagation in Structural Connections Produced with Wire Arc Additive Manufacturing

J. Olsson, **M. Ander***, O. Borgström, S. Larsson, E. Tibuzzi, C. Williams

Discrete numerical modelling of capsule-asphalt mixture system for self-healing purposes

G. Câmara*, N. Monteiro Azevedo, R. Micaelo

Tue, 10/10/2023 14:40 - 15:20

Room Solari

IS03 - Granular Plasticity III

Organized by: F. Nicot, A. Wautier and F. Darve

Chaired by: Prof. Nicot Francois (INRAE)

Effect of Pebble Size Distribution on Drucker-Prager Model Parameters for Lithium-Based Pebble Beds

D. Pawar*, R. Annabatula, N. Swaminathan

Shear banding as an optimal dissipative structure

F. Nicot*, X. Wang, A. Wautier, R. Wan, F. Darve

Tue, 10/10/2023 14:40 - 15:20

Room Manzoni

IS23 - Multiphysics and Coupled Modelling with Particle Methods V

Organized by: J. Rojek and T. Zohdi

Chaired by: Prof. Jerzy Rojek (Polish Academy of Sciences)

Hard Elasto-hydrodynamic Lubrication Analysis Method Using a Particle Method

S. Hiramoto*, K. Shibata, H. Negishi, S. Obara, M. Kondo

Gaseous Cavitation Model for Hydrodynamic Lubrication Simulation by a Particle Method

K. Matsumoto*, K. Shibata, H. Negishi, S. Obara, M. Kondo

Tue, 10/10/2023 14:40 - 15:20

Room Porta

IS17 - Recent Advances and Applications of the Particle Finite Element Method (PFEM) II

Organized by: A. Franci and J. Gimenez

Chaired by: Dr. Alessandro Franci (CIMNE/UPC.)

Quality-based Mesh Adaptation in the Particle Finite Element Method: Extension to 3D

T. Leysens*, J. Remacle, J. Lambrechts

Indicator Function as a Method of Element Filtering in Particle Finite Element Method (PFEM).

S. Karmakar*, R. Traxl, R. Lackner

Tue, 10/10/2023 14:40 - 15:20

Room Borromeo

IS26 - Advances in Particle-Scale Perspectives in Multiphysics Particle Systems II

Organized by: D. Wilke, P. Pizette and J. Joubert

Chaired by: Dr. Patrick Pizette (IMT Nord Europe)

Contact Laws and Their Implications on Information Chain Networks

D. Wilke, P. Pizette*, J. Joubert

A methodology for 3D concrete printing process modelling using the Discrete Element Method (DEM)

H. Karkaba*, P. Pizette, L. Etienne, A. Guilloleau, K. Langueh, S. Lecoeuche, D. Juge Hubert

Tue, 10/10/2023 14:40 - 15:20

Room Toscanini

IS14 - Particle-Based Methods for Natural Hazards Simulation II

Organized by: M. Cremonesi, J. Gaume and A. Larese

Chaired by: Prof. Johan Gaume (ETH Zürich), Prof. Antonia Larese (University of Padua)

An elastic-viscoplastic continuum model for granular flows: applications to snow avalanches

L. Blatny*, N. Gray, J. Gaume

MPS-Based Shallow Water Simulation with Particle Splitting for Tsunami Runup

I. Saigo*, S. Koshizuka

Tue, 10/10/2023 15:30 - 16:30

Room Volta

IS25 - Coupled Approaches Between Particle and Continuum Methods for Solids Mechanics and Fluid-Structure Interaction Problems I

Organized by: A. Cornejo, F. Zárte and E. Oñate

Chaired by: Prof. Alejandro Cornejo (UPC - CIMNE)

A DEM-FEM Coupling Framework Applied to Railroad Infrastructure Simulations

A. Ullrich*, J. Quist, C. Cromvik, K. Jareteg, A. Bilock, F. Edelvik

Elastic Behaviour of Linear Structures Using Modal Superposition and Lagrangian Differencing Dynamics

M. Paneer*, J. Bašić, Ž. Lozina, D. Sedlar, C. Peng

A coupled Lagrangian framework for modelling multi-fracturing structures in natural hazards scenarios

A. Cornejo*, A. Franci, M. Masó, F. Zárte, E. Oñate

Tue, 10/10/2023 15:30 - 16:30

Room Solari

IS27 - Particle Based Models for Biological and Biomedical Systems

Organized by: Debanjan Mukherjee

Chaired by: Prof. Debanjan Mukherjee (University of Colorado Boulder)

Towards a digital meniscus - using the DC-PSE method informed by μ CT scans

A. Obeidat*

Characterization of Exhaled Breath — Multidisciplinary Computational Studies for the Metrics of Aerosol Transport and Deposition

V. Malave*

Discrete Particle Modelling Of Blood Clot Mechanics Under Contraction.

C. Teeraratkul*, D. Mukherjee

Tue, 10/10/2023 15:30 - 16:30

Room Manzoni

IS09 - Particle-Based Methods in Mining and Mineral Processing I

Organized by: S. Larsson and P. Jonsen

Chaired by: Dr. Simon Larsson (Luleå University of Technology)

Modeling breakage of green iron ore pellets by impact Keynote

A. Thomazini, R. Carvalho*, E. Cunha, L. Tavares

Simulation of Brittle Fracture in Large Particle Systems

L. Suarez*, J. Quist, E. Olsson

Tue, 10/10/2023 15:30 - 16:30

Room Porta

IS18 - Particle-Laden Flows I

Organized by: S. R. Idelsohn and E. Oñate

Chaired by: Prof. Sergio Idelsohn (CIMNE)

An efficient implementation of four-way coupled particle-laden flow in high-order discontinuous Galerkin schemes

P. Kopper*, A. Schwarz, M. Pfeiffer, S. Copplestone, E. De Staercke, A. Beck

Some of the difficulties in solving fluids that contain particles within them

S. Idelsohn*, J. Gimenez, E. Oñate

A comparative study of lattice Boltzmann models for particle deposition processes with the formation of fouling layers

H. Saraiva Tavares*, L. Moriconi, J. Braga Rodrigues Loureiro

Tue, 10/10/2023 15:30 - 16:30

Room Verdi

IS06 - Processing Particulate Material in an Industrial Environment I

Organized by: B. Peters, H. Rusche and H. Jasak
Chaired by: Prof. Bernhard Peters (University of Luxembourg)

Simulating industrial scenarios: with the open-source software MercuryDPM Keynote

A. Thornton*, Q. Nguyen, H. Polman, J. Bisschop, R. Weinhart-Mejia, M. Post, D. Fitzsimmons, M. Vesal, I. Ostanin, T. Weinhart

Implementation of a Large Scale 3-Dimensional Numerical Model of a Industrial Biomass Furnace using the Extended Discrete Element Method
D. Louw*, B. Peters, X. Auquier, J. Sliepen

Tue, 10/10/2023 15:30 - 16:30

Room Borromeo

IS20 - Particle-Based Methods for Oil & Gas Industry

Organized by: M. Celigueta, G. Casas and I. de Pouplana
Chaired by: Dr. Miguel Angel Celigueta Jordana (Altair Engineering)

A DEM Based Procedure for Assessing Mechanical Degradation of Carbonate Rocks due to CO2 Interaction

M. De Simone*, L. Souza, D. Roehl

Development of DEM Models and Automatic Parameter Calibration Tools for Understanding Sedimentary Rock Behaviour

C. Shang*, M. Celigueta, G. Casas, S. Latorre

Computational investigation of the influence on the granular temperature in the sand screen performance

J. González-Usúa*, G. Casas, I. de Pouplana, E. Oñate

Tue, 10/10/2023 15:30 - 16:30

Room Toscanini

IS13 - Data-Driven Modelling of Particulate and Multiphase Systems I

Organized by: C. Windows-Yule
Chaired by: Mr. Leonard Nicusan (University of Birmingham)

Standardized workflow for 3D characterization of iron ore's particles using X-ray Computed Tomography

S. Gupta*, V. Moutinho, J. Godinho, P. Krolop, J. Gutzmer

On slip predictability for sheared granular systems

P. Bretz, **L. Kondic***, M. Kramar

Particle Method for Generation of Hybrid Terramechanics Model Training Data

E. Karpman, **J. Kovacs***, M. Teichmann

Tue, 10/10/2023 16:30 - 17:00

Palazzo delle Stelline

Coffee Break

Tue, 10/10/2023 17:00 - 19:00

Room Volta

IS25 - Coupled Approaches Between Particle and Continuum Methods for Solids Mechanics and Fluid-Structure Interaction Problems II

Organized by: A. Cornejo, F. Zárate and E. Oñate
Chaired by: Prof. Alejandro Cornejo (UPC - CIMNE)

Comparison of Interpolation Algorithms on Non-Matching Meshes for Partitioned Thermo-Mechanical Fluid-Structure Interactions

M. Lacroix*, S. Février, E. Fernandez, L. Papeleux, R. Boman, J. Ponthot

A coupled DEM-CFD model to study the physical behavior of loose armor revetments in maritime waterways

J. Sorgatz*, M. Herbst, H. Konietzky, M. Pohl

Numerical study of rain and droplet flow on rough surfaces considering air-coupled effect with SPH

X. Yan, Z. Nie, **Z. Ji***

A Particle-Based Lagrangian Immersed Boundary Formulation for Modelling Solid-Fluid Chemical Adsorption Dynamics

A. Dhruv*, S. Kaur, A. Dubey

Tue, 10/10/2023 17:00 - 19:00

Room Solari

IS22 - Particle Methods for Large Deformation Problems in Geomechanics

Organized by: L. Monforte, J. Carbonell, M. O. Ciantia and M. Arroyo

Simulation of insertion problems in partially saturated soils with the Particle Finite Element method

L. Monforte*, M. Arroyo, J. Carbonell, A. Gens

Modelling of root-soil interactions for slope stability problems using the PFEM

J. Carbonell*, L. Monforte, M. Arroyo

Normalisation of Rate Effects during Piezocone Penetration Testing: A Numerical Study

L. Hauser*, L. Monforte, M. Arroyo, H. Schweiger

G-PFEM Modelling of Cone Penetration in Layered Soils

K. Boschi*, L. Monforte, M. Arroyo, J. Carbonell, A. Gens

Advancing Cone Penetration Test Interpretation In Structured Clays With The Particle Finite Element Method (PFEM)

G. Alyamani*, M. Rouainia

Comparison of continuum (PFEM) and discrete (DEM) approaches for large insertion BVPs in soft rocks

M. Ciantia*, J. Zheng, M. Previtali, J. Knappett

Tue, 10/10/2023 17:00 - 19:00

Room Manzoni

IS09 - Particle-Based Methods in Mining and Mineral Processing II

Organized by: S. Larsson and P. Jonsen
Chaired by: Dr. Simon Larsson (Luleå University of Technology)

A Particle-Scale Model of Charge and Slurry Behaviour in SAG mills Including Coarse Particle Breakage, Attrition and Slurry Phase Grinding

M. Sinnott*, P. Cleary, R. Morrison

Advancing Dynamic Process Modeling of Comminution and Classification Circuits: A Paradigm Shift with GPU-Enabled DEM Solver

J. Quist*, F. Edelvik

A Numerical Study on the Dynamic Brazilian disc test using a Statistical Bonded Discrete Element Method

A. Wessling*, S. Larsson, J. Kajberg

Exploring the Impact of Particle Size Distribution on Crusher Sorting in SAG Mills via Machine Learning

S. Laudari*

Simulation of wear on tricone drill bits using a bonded DEM model and geometry update

A. Svanberg*, A. Malmelöv, S. Larsson

Tue, 10/10/2023 17:00 - 19:00

Room Porta

IS18 - Particle-Laden Flows II

Organized by: S. R. Idelsohn and E. Oñate

Chaired by: Prof. Eugenio Oñate (CIMNE/UPC)

A Particle Finite Element approach to model sediment transport and erodible surfaces

S. Martini*, A. Corigliano, M. Cremonesi

Numerical analysis of Bingham fluid effect on particle suspension rheology in two dimensional parallel plate flow

K. Tomioka*, T. Fukui

Direct Numerical Simulation of Particle Migration and Stochastic Clogging during Suspension Transport in Narrow Planar Fractures

C. Leonardi*, N. Di Vaira, Ł. Łaniewski-Wolk

Exploration into the thermal inhomogeneities dependent particle self-organization in fluid-flow under reduced gravity conditions.

B. Manayil Santhosh*, M. Lappa

Tue, 10/10/2023 17:00 - 19:00

Room Verdi

IS06 - Processing Particulate Material in an Industrial Environment II

Organized by: B. Peters, H. Rusche and H. Jasak

Chaired by: Prof. Bernhard Peters (University of Luxembourg)

Determining Coke Moisture Content Through Images Analysis Methods and Machine Learning Models

M. Li*

6-way CFD-DEM-FEM partitioned momentum coupling using preCICE

P. Adhav*, X. Besseron, B. Peters

Optimising the rheology of dense granular suspensions using DEM modelling and machine learning

C. Labra*, S. Pantaleev

Particles-wall friction behaviour, a new way to characterize powder spreadability in L-PBF applications.

M. Stephan*, G. Roux, A. Burr, C. Ablitzer, J. Garandet

Immersed Boundary Method as a CFD Solver in CFD-DEM Simulation

S. Hassanzadeh Saraei*, B. Peters

Tue, 10/10/2023 17:00 - 19:00

Room Borromeo

IS10 - Upscaling of Particle Systems

Organized by: S. Papanicolopoulos, J. Y. Ooi, K. J. Hanley and V. Magnanimo

Chaired by: Dr. Stefanos Papanicolopoulos (University of Edinburgh)

Ultra fast calculation of heat transfer in a moving granular medium

C. Haydar*, S. Martin, O. Bonnefoy

Structuring a micro-scale term for size-driven segregation for the particles upscaled to the same size parcels with DEM

M. Stasiak*, S. Martin, S. Emam, F. Dedecker

Deformable and Breakable DEM Particle Clusters for Modelling Plastic and Brittle Materials

L. Orefice*, J. Khinast

Discrete to Continuum Upscaling for Rotational Particle Information

M. Winkelmann*, V. Magnanimo, S. Luding, S. Papanicolopoulos

Mixed discrete-continuum modelling of dense granular flow

A. Mathews*, H. Cheng, M. Celigueta, S. Papanicolopoulos, J. Ooi

The Influence of Grain Size Distribution on the Rheology of Sheared Highly Polydisperse Granular Materials

A. Herman*

Tue, 10/10/2023 17:00 - 19:00

Room Toscanini

IS13 - Data-Driven Modelling of Particulate and Multiphase Systems II

Organized by: C. Windows-Yule

Chaired by: Mr. Leonard Nicusan (University of Birmingham)

A Neural Network Based Framework to Model Particle Rebound and Fracture Keynote

A. Schwarz*, P. Kopper, A. Beck

E(3) Equivariant Graph Neural Networks for Lagrangian Fluid Mechanics

A. Toshev*, S. Adami, N. Adams

Use of GranuDrum Digital Twin to Evaluate the Relation Between the Cohesive Index and the Strength of Cohesive Interactions

A. Neveu*, G. Lumay, F. Francqui

Vertical Milling; Why 44 is the Meaning of Life, the Universe, and Everything

D. Rhymmer*, A. Ingram, K. Windows-Yule

ACCES: Multi-Objective Calibration and Optimisation of DEM Simulations via Evolutionary Algorithms

A. Nicusan*, D. Werner, J. Sykes, J. Seville, K. Windows-Yule

Ensemble Kalman Filter Adapted to Particle Simulations

M. Duvillard*, L. Giralidi, O. Le Maître

Tue, 10/10/2023 20:30 - 22:30

Palazzo delle Stelline

Conference Dinner

Wednesday, 11/10/2023

Wed, 11/10/2023 09:00 - 10:30

Room Volta

Plenary Lectures II - J. Andrade and M. Liu

Chaired by: Prof. Eugenio Oñate (CIMNE/UPC)

Adaptive Data-Driven Modeling of Complex Systems Jose Andrade

J. Andrade*

Particle-based Modeling of Metal Powder Additive Manufacturing

M. Liu*

Wed, 11/10/2023 10:30 - 11:00

Palazzo delle Stelline

Coffee Break

Wed, 11/10/2023 11:00 - 13:00

Room Volta

IS11 - Fundamentals of DEM and CFD-DEM: Recent Advanced and Challenges I

Organized by: C. Kloss, S. Radl, A. Mayrhofer and C. Goniva

Chaired by: Dr. Christoph Kloss (DCS Computing)

DEM Study Investigating the Effect of Particle Shape on Compaction of Realistic Non-Spherical Particles Using Convolutional Neural Network Keynote

K. Giannis*

Learning Physics-consistent Particle Interactions

Z. Han*, O. Fink, D. Kammer

DEM and CFD-DEM: From established technology to new frontiers

C. Kloss*, A. Mayrhofer, M. Niemann, A. Aigner, P. Seil, M. Kwakkel, C. Goniva

Assessing the Impact of Relative Motion on Hydrodynamic Force Interactions between Particles Pair

L. Barbeau*, B. Blais, C. Béguin, S. Étienne

Wed, 11/10/2023 11:00 - 13:00

Room Solari

IS19 - Numerical Modelling of Impacts of/on Granular Media I

Organized by: C. di Prisco, I. Redaelli and P. Marvaggio

Chaired by: Dr. Claudio Di Prisco

Understanding Particle Flow Behaviour in Irregular Ore Pass Geometries with Non-Spherical Particles using Non-Smooth Contact Dynamics

T. Phan*, E. Salmi, E. Sellers, Y. Lu, E. Azéma

Examination of the Influence of Particle Parameters on Contact Heat Transfer on a Single Hearth Furnace Floor Using DEM

N. Hilse*, V. Scherer

Heterogeneous Deformation in Sheared Granular Materials

P. Shekari*, P. Rognon, B. Marks

Particle Morphological Effects on the Behaviour of Dry Granular Flow Against Rigid Obstacles

P. Dhanai*, D. Bhattacharya

Tailored Characterization Testing: A DEM Case Study for Bin Blending

F. Mostafaei, J. Khinast, T. Forgber*

Wed, 11/10/2023 11:00 - 13:00

Room Manzoni

IS02 - Fracture and Fragmentation With DEM I

Organized by: F. Kun and F. K. Wittel

Chaired by: Prof. Kun Ferenc (University of Debrecen)

Comparative Analysis of Softening Contact laws in Particle Models: Application to Rock and Concrete Keynote

N. Monteiro Azevedo*, M. Braga Farinha, S. Oliveira

Role of breakage in the polyhedral discrete element model of railway ballast

Á. Orosz*, K. Tamás, K. Bagi

Discrete Element and Experimental Analysis of Marginal Road Materials

K. Etikan*, D. Jelagin, E. Olsson, M. Partl

Sanded wheel-rail contacts: DEM simulation of single sand grain crushing

B. Suhr*, K. Six

Discrete Element Modelling of the Tensile Failure of Porous Rocks

C. Szusziik*, F. Kun

Wed, 11/10/2023 11:00 - 13:00

Room Porta

IS16 - Micro-Macro Methods for States and Transitions: from Particles to Continuum I

Organized by: S. Luding and D. Vescovi

Chaired by: Dr. Dalila Vescovi (Politecnico di Milano)

Slow flow and creep in soft deformable hydrogel particle packings Keynote

Z. Farmani, C. Shakya, J. Wang, R. Stannarius, T. Mullin, J. Dijkstra*

Micro-macro methods: states and transitions from particles to continuum

S. Luding, D. Vescovi, V. Magnanimo*

Phase transition in granular systems

D. Vescovi*

Precursors of inertial transitions in granular materials: search for a consistent definition for the mesoscopic second-order work

A. Clerc*, A. Wautier, S. Bonelli, F. Nicot

Towards a Hierarchical Continuum-Discrete Multiscale Methodology for the Thermomechanical Simulation of Dense Granular Media

R. Rangel*, A. Franci, J. Gimenez, E. Oñate

Wed, 11/10/2023 11:00 - 13:00

Room Verdi

IS21 - MPM Modelling of Soil-Water Structure Interaction Problems in Geomechanics I

Organized by: F. Ceccato, A. Yerro, M. Martinelli and P. Marveggio

Chaired by: Dr. Francesca Ceccato (UNIVERSITY OF PADUA)

Static Liquefaction in Partially Saturated Soil. Modelling with the Material Point Method. Keynote

G. Di Carluccio*, L. Aviles, N. Pinyol

Using MPM to Model the Effect of Groundwater Conditions on Landslide Mobilization

J. Montgomery*, J. Murphy

MPM Analysis of Karst Systems as Possible Rupture Inducers of Tailings Dams

D. Toro Rojas*, A. Yerro, M. Cordão Neto

MPM simulation of a landslide in sensitive clays

L. Pugliese*, A. Parise, A. Troncone

MPM modelling of soil structure interaction problems in liquefied granular materials: the role of visco-plasticity

L. Flessati, **P. Marveggio***

Wed, 11/10/2023 11:00 - 13:00

Room Toscanini

IS14 - Particle-Based Methods for Natural Hazards Simulation III

Organized by: M. Cremonesi, J. Gaume and A. Laresse

Chaired by: Prof. Antonia Laresse (University of Padua), Prof. Johan Gaume (ETH Zürich)

GPU-accelerated matrix-free ISPH for large-scale simulation of wave-induced disasters

H. Zhang*, X. Li, Z. Qian, M. Liu

Physical Process-Based Entrainment Behaviour Modelling of Diluted Debris Flow Using SPH Incorporated with HBP-DP Approach

Y. Ma*, M. Asai, Z. Han, G. Chen

Modelling of urban flooding in the built environment using an SPH implementation

F. Hunger*, A. Ullrich, K. Jareteg, A. Bilock, J. Quist, F. Edelvik

Bottom Boundary-Fitted Free Surface Flow Simulation with Coordinate Transformation Using SPH(2)

S. Fujioka*, K. Tsuji, N. Mitsume, M. Asai

Three-Dimensional SPH Simulation for Lava Flow Phenomena

S. Tomita*, J. Yoshikawa, M. Sugimoto, H. Komen, M. Shigeta

Dynamic Modelling of the Landslide-induced Tsunami-like Wave Using a Coupled Discontinuous Deformation Analysis and Smoothed Particle

Hydrodynamics Method

C. Li*, G. Wang, G. Chen

Wed, 11/10/2023 13:00 - 14:00

Palazzo delle Stelline

Lunch Break

Wed, 11/10/2023 14:00 - 16:00

Room Volta

IS11 - Fundamentals of DEM and CFD-DEM: Recent Advanced and Challenges II

Organized by: C. Kloss, S. Radl, A. Mayrhofer and C. Goniva

Chaired by: Dr. Stefanos Papanicolopoulos (University of Edinburgh)

Development and Validation of a High Order Finite Element CFD-DEM Solver

T. El Geitani*, S. Golshan, B. Blais

Particle-Level Experiments of Non-Dilative Interfaces: Accurate Input Parameters for Numerical Simulations

L. Kandpal*, P. Vangla

Investigation of the draw down test method for the calibration of the DEM sliding friction and rolling friction parameters of a cohesionless bulk material

J. Marin Pérez*, T. Comlekci, D. MacKenzie, Y. Gorash

One Discrete Element vs. Two Finite Elements and the Arbelos of Archimedes

D. Reischl*

2D DEM Study of Force Transmission in Flexible Granular Chain Packings

M. Bhat*, T. Murthy

Wed, 11/10/2023 14:00 - 16:00

Room Solari

IS19 - Numerical Modelling of Impacts of/on Granular Media II

Organized by: C. di Prisco, I. Redaelli and P. Marveggio

Chaired by: Dr. Claudio Di Prisco

Crunchy or Goopy? A Continuum Model for the Solid-Fluid Transition

R. Lubbe*, H. Cheng, P. Gupta, S. Luding, V. Magnanimo

Impact Pressure Quantification of Compressible Granular Flows Using the Material Point Method

M. Kohler*, J. Gaume, C. Ancey, B. Sovilla

Numerical Simulation of a Laboratory-Scale Free Fall Cone Penetrometer Test in Marine Clay with the Material Point Method

D. Mohapatra*, M. Saresma, J. Virtasalo, W. Solowski

MPM analyses of the impact of a dry granular flow against a rigid wall with a multi-regime constitutive model

M. Zerbi*, P. Marveggio, C. di Prisco

Wed, 11/10/2023 14:00 - 16:00

Room Manzoni

IS02 - Fracture and Fragmentation With DEM II

Organized by: F. Kun and F. K. Wittel

Chaired by: Prof. Kun Ferenc (University of Debrecen)

Characterising the Failure Process in Cohesive Granular Steps

F. Ma*, P. Lagrée, L. Staron

Numerical Dynamic Analysis of Bending Concrete Beams Using DEM with Breakable Aggregates

M. Nitka*

Pure DEM Modelling of Single Particle-Loaded Elastic Fibre subjected to Axial Stretching

A. Ajmani*, C. Mehring

Rupture cascades in a discrete element model of shrinkage induced cracking

R. Sztarmári*, F. Kun

Wed, 11/10/2023 14:00 - 16:00

Room Porta

IS16 - Micro-Macro Methods for States and Transitions: from Particles to Continuum II

Organized by: S. Luding and D. Vescovi

Chaired by: Dr. Dalila Vescovi (Politecnico di Milano)

Continuum modelling of granular liquid crystals

D. Berzi*, B. Nadler, D. Vescovi

Continuum modelling of granular flow with dynamic compressibility

T. Barker*

Importance of Periodic Boundaries or Frictionless Walls in Simulating Elementary Response of Angular Particles

U. Ali*, M. Kikumoto, M. Ciantia, M. Previtali, Y. Cui

Coarse-Grained Hopper Flow Kinematics of Non-Convex Polygons

N. Kalyan*, R. Kandasami

Critical behaviors of granular flow between parallel plates near jamming

M. Otsuki*, K. Hayashi, K. Yoshii

X-ray observations of granular jumps in a conveyor belt setup

A. Escobar Rincón*, J. Baker, F. Guillard, I. Einav, T. Faug

Wed, 11/10/2023 14:00 - 16:00

Room Verdi

IS21 - MPM Modelling of Soil-Water Structure Interaction Problems in Geomechanics II

Organized by: F. Ceccato, A. Yerro, M. Martinelli and P. Marveggio

Chaired by: Dr. Francesca Ceccato (UNIVERSITY OF PADUA)

MPM framework for earthquake site response: performance of a shallow foundation on liquefiable soil during earthquake loading

A. Alsardi, **A. Yerro***

Quantitative Comparison of Motion Integration Strategies in the Material Point

S. Duverger*, J. Duriez, P. Philippe, S. Bonelli

On the application of the material point method for spudcan penetration

Y. Sugiyama*, K. Nakamura

Numerical Investigation of the Installation of Suction Caisson in Sand Using Material Point Method

M. Alturki*, A. Faramarzi, L. Zambrano-Cruzatty, M. Mehravar, S. Dirar

Numerical Investigation of Pressuremeter Test with Material Point Method

H. Kurugodu*, D. Bhattacharya, P. Vangla, D. Frost

Wed, 11/10/2023 14:00 - 16:00

Room Toscanini

IS14 - Particle-Based Methods for Natural Hazards Simulation IV

Organized by: M. Cremonesi, J. Gaume and A. Larese

Chaired by: Prof. Antonia Larese (University of Padua), Prof. Johan Gaume (ETH Zürich)

Numerical Simulation of Landslide-Generated Waves Problems

A. Franci*, M. Masó, I. De Pouplana, A. Cornejo, M. Cremonesi, U. Perego, A. Montanino, E. Oñate

Sea waves modelled with Lagrangian particle-based methods.

N. Salis*, A. Franci, S. Idelsohn, A. Reali, S. Manenti

A Semi-Conservative Depth Averaged Material Point Method For Fast Flow-like Landslides With Front-Tracking

M. Fois*, C. de Falco, L. Formaggia

2D DEM-LBM modelling of localized hydraulic failure within a cemented granular layer

A. Farhat*, P. Philippe, L. Luu, P. Cuellar, N. Banahmed, T. Wichtmann

2D combined DEM-LBM modelling of submerged sinkhole occurrence during a massive flood event

P. Philippe*, J. Fan, L. Luu, G. Noury

Wed, 11/10/2023 16:00 - 16:30

Room Volta

Closure Ceremony