

**CIVIL-COMP 2023**  
**The Seventeenth International Conference on**  
**Civil, Structural and Environmental Engineering Computing**  
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**Special Session: CC-S8**

**Lattice discrete particle models, discrete element method,  
material point method and other methods supplementing  
the finite element method**

**Organizer:**

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**Aims and scope of the special session:**

The finite element method (FEM) is the most widespread method for numerical solution of huge amount of engineering and scientific problems. However, there are specific problems, like crack propagation, multi-phase interactions, free surface detection, etc., where difficulties with convergence and stability of the FEM were encountered. To overcome the difficulties described, many numerical methods based on particles were introduced. For example, discrete element method, material point method, methods based on lattice discrete particle models, etc. These methods are very computationally demanding, mainly because they are integrated in time by an explicit method which require very short time steps. The number of particles has to be usually very large. The particle methods are used independently or in combination with the FEM, which reduces the computational demands.

Contributions concerning with numerical methods based on particles or their combination with the FEM, their efficient time integration and efficient implementation are welcome.