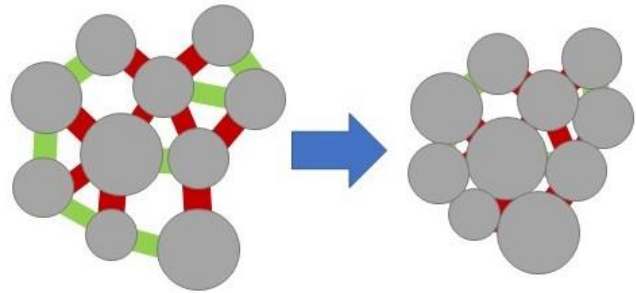


## Open PhD position on Meso-scale DEM for flowability assessment of weakly consolidated fine powders in industry

The Powder Technology group at the **University of Salerno**, Italy, under the supervision of Professor Massimo Poletto, and the Granular Mechanics and Industrial Infrastructure group at the **University of Edinburgh**, United Kingdom, under the supervision of Professor Jin Ooi, offer a **three years** joint PhD project on **meso-scale DEM for flowability assessment of weakly consolidated fine powders in industry**, in the framework of the EU funded MSCA Innovative Training Network TUSAIL (<https://tusail.eu/>). The first two years will be spent in Salerno and the final one in Edinburgh. Secondments in industry at **EDEM**, UK and **Johnson Matthey**, UK, are also planned.

The project aims at finding a relationship between self-aggregation and the flow properties of fine cohesive powders in weakly compacted conditions. For this purpose, the project requires experimentation on fine powders with controlled consolidation in order to determine different sizes of the aggregates and different organizations of the aggregates. Each powder sample will be tested under controlled conditions in order to estimate the size of the aggregate, the geometric properties of the aggregate and the flow properties of the powder.

In the first part of the project in Salerno, shear experiments will be carried out with both conventional and innovative devices. In order to verify the effect of powder agglomeration, tests with artificially aggregated powders will also be carried out. One possible technique is the compression with a controlled stress of a layer of powder and the subsequent discharge and rupture of this layer in a container where the artificially agglomerated material is collected before being used in the tester. In addition to shear tests, gas permeability tests will be also performed, in order to verify to what extent this property can be a good indicator of aggregation. The experiments will also be conducted with standardized shear testers but using non-standard procedures possibly able to preserve the aggregates. The aim is to understand how the different devices used are able to effectively measure the variations in flow properties with aggregate powders.



In the second part in Edinburgh, the experimental results will be used to develop and calibrate a DEM (Discrete Element Method) model to verify if a meso-scale approach can reproduce the behaviour of the aggregate dust. The validation of the model will be carried out through the experimental observation of the flow behaviour in small dosing hoppers or drying and granulation units.

The PhD project will **start in June 2021** and will offer a very generous salary if compared to EU standards. We are looking for outstanding candidates holding a **Master degree in engineering, physics or chemistry** with good capabilities in both experimental activities and scientific programming.

The official call, with instructions to apply **by 26 April 2021**, is available here: <https://web.unisa.it/ricerca/assegni-ricerca/bandi?anno=2021&bando=5032>. Informal inquiries can be sent to Prof. Poletto ([mpoletto@unisa.it](mailto:mpoletto@unisa.it)), eventually attaching a one page CV with the date of Master graduation, the transcript of records and a one page abstract of the Master thesis or equivalent research project.