EMI 2024 IC – TU Wien

Vienna, Austria

September 11 – 13, 2024

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ENGINEERING MECHANICS INSTITUTE 2024
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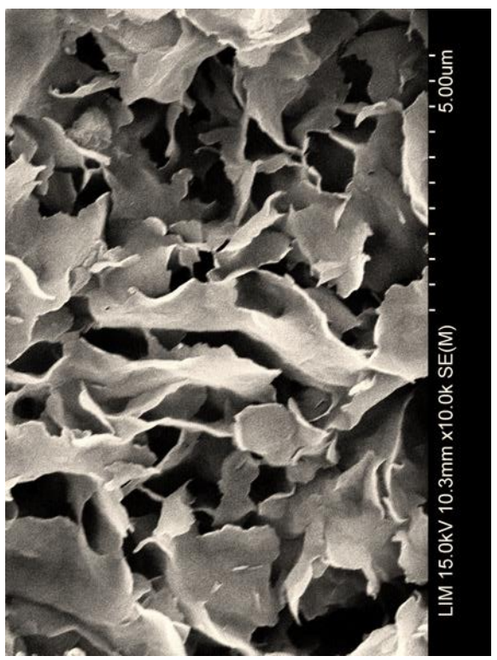
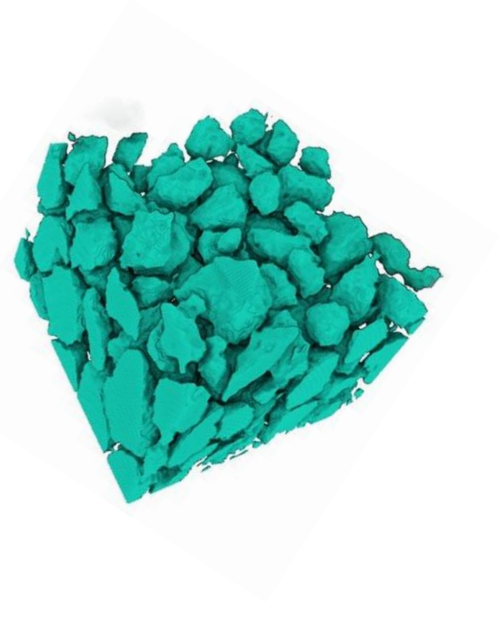
MS11 - Mechanics of Multiphase-Multiscale Granular and Particulate Systems



Abstract

Granular materials are ubiquitous in nature and industry. Seventy-five percent of raw industrial materials are in particulate forms. Nature also provides ample examples from rocks to dusts. Engineering design to mitigate natural disasters such as landslide, mudflow, earthquakes, and to process industrial materials from its raw form to the final product relies on fundamental knowledge of granular mechanics. The scales of these problems start from the particle size as the basis. They go down in scale when the surface properties of the particles are important, and up in scale when particles form structures, and when the domain size become much greater than individual particles. Seldom these granular materials exist in a vacuum. Hence the environment plays a role. When particles are charged, as those of clays for instance, the electromagnetic forces must be considered. If there is a significant fluid component in the interstices, the interaction between the fluid and the particles may have significant impact on their mechanical behavior.

The granular materials themselves also demonstrate a broad range of phases from gas-like to solid-like, depending on the loading conditions and the material properties as well. Because of the complex physical processes and different scales involved, granular mechanics crosses many engineering disciplines. It also needs expanded science at the edge of several academic fields, as for example out-of-equilibrium thermodynamics and statistical physics to define some of the fundamental mechanisms relevant to all granular systems. Much of this development is still in its early stage. Inputs from both scientists and engineers are needed.
In this mini-symposium we look forward to papers in any field of engineering applications that involve granular and particulate materials, papers that address how to solve one of such problems, or ideas on how to better formulate some fundamental aspects of a host of these problems.



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