ulm university universität ulm

Fakultät für Mathematik und Wirtschaftswissenschaften
Institut für Stochastik

Universität Ulm | 89069 Ulm | Germany

Professor Dr. Volker Schmidt

Helmholtzstraße 18
89081 Ulm, Germany

Tel: +49 731 50-23532
Fax: +49 731 50-23649
volker.schmidt@uni-ulm.de
http://www.uni-ulm.de/stochastik/

17. August 2015

Einladung zum Vortrag

von

Prof. Dr. Stefan Luding

University of Twente

From particle simulations to continuum theory and applications

The dynamic behavior of granular materials is of considerable interest in a wide range of industries (e.g. metallurgy, pharmaceutical, chemical and food processing). In these industries, every step in the product manufacturing process contributes to the final quality of the product. Hence, if optimal product quality is to be achieved, a full understanding and control of the different stages of the particle creation and production process is essential.

The fundamentals can be studied by direct particle simulation methods, where often the fluid between the particles is important too, in order to gain a microscopic understanding of the processes. For large-scale applications, a micro-macro transition towards continuum theory is necessary, however, smaller applications can be modeled nowadays directly by discrete methods. As one example, we use experiments and discrete particle simulations (DEM) to investigate the dosing of cohesive fine powders via coarse, meso-scale particles.

The micro-macro transition from discrete particulate systems to continuum theory involves a mathematical homogenization or coarse-graining that translates particle-positions, -velocities and -accelerations into density-, stress-, and strain-fields, by statistical spatial- and temporal averaging. The macroscopic fields are compatible with the conservation equations for mass and momentum of continuum theory, and also the fluctuating kinetic energy provides a measure for the importance of fluctuations in those systems. The ultimate goal is to find constitutive relations which contain information about the micro-structure and -fluctuations, and to solve those on the macro-level for solving application and optimization problems.

Termin: **Dienstag, 18. August 2015, 9:00 Uhr**

Ort: **Universität Ulm, Helmholtzstr. 18, Raum 2.20**

Der Vortrag findet im Rahmen unseres Forschungsseminars statt.
Alle Interessenten sind herzlich eingeladen.

gez. V. Schmidt