

## Powders & Grains 2001

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The Fourth International Conference on Micro-mechanics of Granular Media (Powders & Grains 2001) was held at Hotel New World, Sendai, Japan, May 21-25, 2001. The participants were about 160 researchers from 18 countries. The conference was organised under the auspices of the Association pour l'Etude de la Micromécanique des Milieux Granulaires as the past three conferences held at Clermont-Ferrand, France (1989), Birmingham, England (1993) and Durham, USA (1997). The aim of this conference, the first meeting in the new century, was to communicate successive developments in the field of micro-mechanics of granular media.

As is widely recognised, understanding the behaviour of granular media in terms of micro-mechanics is of fundamental importance in a number of areas of science and technology, and the complexity of the mechanics of granular media requires interdisciplinary discussions involving mathematicians, physicists, geologists, and chemical-, civil-, mechanical-, and agricultural engineers. Practical goals of this activity are to realise the improvements in industrial production, process performance, construction design, and so on.

Prior to the conference, the proceedings with a volume of 635 pages was published by A.A. Balkema Publishers. The contents were divided into the following fifteen groups: Packing Geometry, Cohesion and Cracking, Measurement System, Wave Propagation, Quasi-static Modelling, Quasi-static Behaviour, Submerged Behaviour, Localised Deformation, Externally Forced Behaviour, Shear Flow, Vertical Flow, Surface Flow, Vibrated Flow, Mixed Flow, Viscous Flow and Crushing.

The conference was started with the welcome address by Prof. Yuji Kishino, the Chairman of Organising Committee (Photo 1). The total number of oral-sessions (groups of 4 presentations) were 16, and 7 of them were preceded by keynote lectures. The keynote lecturers were Drs. R.P. Behringer, D.J. Benson, X. Jia, S. Luding, C. Thornton, I. Vardoulakis, and S. Yuu. As no parallel oral-sessions were scheduled, all the attendees gathered together in one conference room and could discuss with each other from different standpoints. Official and unofficial poster-sessions were opened in the evenings of Monday through Thursday with beer bars and many participants enjoyed their enthusiastic discussions which sometimes continued to midnight. Wednesday evening was allocated for a session of video presentations, most of which were the voluntary presentations. As the visual moving images help us to understand complex behaviours strictly, video presentations should be encouraged more in the future conferences.



*Photo 1: Prof. Yuji Kishino during his welcome address*

By the excellent keynote-lectures and other interesting oral and poster presentations on current topics in various fields, we could see through branches of the mechanics of granular media and look for their future applications. To my personal opinion, the importance of the following topics are to be emphasised: Analysis of force networks that appear in computer-simulations, Pattern formations induced by vibrations, Incremental non-linear behaviours, Connection of discrete and continuum mechanics (including homogenisation technique etc.), Phase transition problems (including transition from static to dynamic flows and liquefaction phenomena).



*Photo 2: The Zuigan-ji Temple in Matsushima, (Dr P. Evesque & myself)*

The excursion to Matsushima, one of the three best scenic points in Japan, took place on Wednesday afternoon. The participants enjoyed a cruise through a lot of tiny

islands with pine trees as well as a visit to Zuigan-ji Temple, one of the Japanese national treasures, which has big traditional buildings and interesting gardens (photo 2). The banquet was held in the evening of Thursday. It was opened by breaking the lid of a big barrel of Japanese wine, which is a Japanese-style ceremony called "Kagamiwari" (Photo 3). As was pointed out by the Chairman of Organising Committee in his closing address of Friday, there were many presentations given by many young researchers. The future development of the micromechanics of granular media will be extensively supported by such people.



*Photo 3: The "Kagamiwari" ceremony. From left to right: Prof. Y. Kishino, Dr P. Evesque, Prof. J.T. Jenkins, Prof. R.P. Behringer, Dr C. Thornton, Prof. G. Gudehus.*

The Scientific Committee decided to hold the next conference, Powders and Grains 2005, in Germany. It will be hosted by Prof. G. Gudehus, University of Karlsruhe, Profs. H.J. Herrmann and S. Luding, University of Stuttgart. Let us look forward to Powders and Grains 2005 and meet again there.