



# Meiji University Global COE Program

## 6<sup>th</sup> Mathematical Sciences based on Modeling, Analysis and Simulation seminar



Date : May 20, 2009, 16:30~17:30

Location : Meiji Univ. Ikuta Campus, Build 2 Annex A, Room A205

### Chiyori Urabe (Meiji Univ.)

Title : Fracture Toughness and Maximum  
Stress in a Disordered Lattice System

Abstract : We will report about fracture in a disordered lattice system. In our system, particles are initially arranged on the triangular lattice and each nearest-neighbor pair is connected with a randomly chosen soft or hard Hookean spring. Every spring has the common threshold of stress at which it is cut. We make an initial crack and expand the system perpendicularly to the crack. We find that the maximum stress in the stress-strain curve is larger than those in the systems with soft or hard springs only (uniform systems). Energy required to advance fracture is also larger in some disordered systems, which indicates that the fracture toughness improves. The increase of the energy is caused by the following two factors. One is that the soft spring is able to hold larger energy than the hard one. The other is that the number of cut springs increases as the fracture surface becomes tortuous in disordered systems.

**Everyone is welcome to attend the MAS seminar.**

Meiji institute for Advanced Study of Mathematical Science (<http://www.mims.meiji.ac.jp>)

(Organizers: M. Mimura, D. Ueyama, Y. Wakano and K. Ikeda)

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Access: 10 minutes on foot from Ikuta St. Odakyu line,  
Or 10 minutes by bus No. 13「明治大学正門前」, get off at the last stop.  
See [http://www.meiji.ac.jp/koho/campus\\_guide/](http://www.meiji.ac.jp/koho/campus_guide/) for details.