



# Meiji University Global COE Program 23<sup>th</sup> Mathematical Sciences based on



## Modeling, Analysis and Simulation seminar

Date : May 13, 2010, 16:30 ~ 18:00

Location : Meiji Univ. Ikuta Campus, Build 2 Annex A, Room A207

**Kenta Odagiri** (Ochanomizu Univ.)

**Title : Pattern formation in autocatalytic  
proliferation systems**

Abstract : Autocatalytic process is often associated with pattern formation, ranging from the atomic scale phenomena to the morphology of living bodies.

In my talk, I focus on pattern formation and its dynamics in autocatalytic proliferation systems. I will first present the very simple model that represents autocatalytic cell proliferation subject to the distribution of nutrition and natural death of the cells by starvation. I will show what is essential to generate a branching pattern like actual bacterial colonies in the model, by comparing the cellular automata approach with the reaction-diffusion equation approach. I next present two kinds of three-component autocatalytic proliferation systems. One consists of consumer (X), its inhibitor (I), and nutrition (N), and the other consists of two different consumers (A, B) and N. Focusing on the “competitive” relation in these models, I will show various kinds of pattern formation and its transition phenomena induced by the change of control parameters of the competition.

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, K. Ikeda and S. Kinoshita)

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(<http://goe.mims.meiji.ac.jp/>), the Grant-in-Aid for Scientific Research (S), “Mathematical Theory of Nonlinear-Non-equilibrium Reaction-Diffusion Systems” by M. Mimura (<http://nrrds.math.meiji.ac.jp/>).



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.