

# Combining and Developing Homogenization Theory and Volume Averaging Theory

## IMI Workshop of the Joint Research Projects

Date November 23 - 25, 2016

Place IMI Conference Room (W1-D-414), West Zone 1, Ito Campus, Kyushu University

This workshop focuses on combining the homogenization theory and the volume averaging theory (Porous Media Theory), which have been developed for treating with the multi-scale and multi-physics phenomena, through lectures and discussions by experts of each theory. Some lectures associated with the homogenization theory and the volume averaging theory will be conducted to reveal the mathematical relationships of both theories. Moreover, discussions with researchers working on universities and industrial companies will lead us an industrial innovation based on mathematics.

### Program **Wednesday, November 23**

(9 lectures)

- 13:30 - Opening
- 13:40 - 14:40 Speaker: Yoshihiko SANO (Shizuoka University)  
Lecture : Overview of the Volume Averaging Theory
- 14:50 - 15:50 Speaker: Jun MASAMUNE (Hokkaido University)  
Lecture : Preliminaries
- 16:00 - 17:00 Speaker: Takashi NAKAZAWA (Tohoku University)  
Lecture : Multi-objective shape optimization on viscous flow fields

### **Thursday, November 24**

- 10:00 - 11:00 Speaker: Fujio KUWAHARA (Shizuoka University)  
Lecture : The determination of the macroscopic model coefficients from the microscopic heat flow field around the porous structure.
- 11:10 - 12:10 Speaker: Jun MASAMUNE (Hokkaido University)  
Lecture : Some theories and applications of homogenization theory
- 12:10 - 13:30 Lunch
- 13:30 - 14:30 Birds of a feather 1
- 14:40 - 15:40 Birds of a feather 2
- 15:50 - 16:50 Birds of a feather 3

### **Friday, November 25**

- 10:00 - 11:00 Speaker: Yoshihiko SANO (Shizuoka University)  
Lecture : Application of the Volume Averaging Theory
- 11:10 - 12:10 Speaker: Jun MASAMUNE (Hokkaido University)

Lecture : Crash course for homogenization theory

12:10 - 13:30 Lunch

13:30 - 14:10 Lecture : Company information session 1

14:20 - 15:00 Lecture : Company information session 2

15:00 - 16:30 Birds of a feather 4