

# 非線型科学

## コロキウム

### Nonlinear Science

### Colloquium

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講演題目：Intelligent Group Behavior by Unintelligent Individuals:  
Autonomous Task Allocation Dynamics of Foraging Ants

Ants have evolved to the present forms from the same ancestor with bees, through which evolution process they have simplified their own structure and the behavior of each, whereas cooperative behavior as a mass of them has got more and more complex and sophisticated. Hence, they have obtained various kinds of “social functions” and are now enjoying the highest level of prosperity among various animals on the earth.

We have focused on the foraging behavior of ants and have performed experiments and mathematical modeling mainly on their group behaviors: In experiments, we have shown that the navigation in foraging walk of ants (*Lasius Japonicus*) is strongly affected not only by chemical cues but also by visual cues, and that the priority between these cues is switched flexibly in accordance with their temporal situation[1]. In the present presentation, we report the above results, and, in addition, we briefly introduce our recent experiments on the statistical behavior of colonies of ants using both i) very-tiny RFID tags (smaller than 0.5mm×0.5mm) attached to each body of all ants and ii) sensors attached to gates connecting a nest and foraging arenas. By analyzing the obtained “big-data of ant society” after more than three-months continuous measurement, we found various kinds of statistical structure of the ant society in which sophisticated task allocation among ants and its dynamical reorganization took place. In particular, our data indicates that the *response threshold model* which has widely been believed to explain the task allocation dynamics of ants should be reconsidered[2].

#### References

- [1]Y.Ogihara, et. al, “Switching of Primarily Relied Information by Ants; A Combinatorial Study of Experiment and Modeling”, in *Mathematical Approaches to Biological Systems: Networks, Oscillations and Collective Motions*, Springer (2015)
- [2]O.Yamanaka and H.Nishimori, “Activity Statistics of Foraging Ants”, Proceedings of SWARM2015, Kyoto (2015)

日時：**2017年 5月31日(水) 18:00~19:00**

場所：早稲田大学 西早稲田キャンパス  
62W号館1階 大会議室

非線型科学コロキウム

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