

平成 29 年 6 月 15 日

国立研究開発法人理化学研究所 望月理論生物学研究室  
望月 敦史 主任研究員殿

国立研究開発法人理化学研究所  
理事 松本洋一郎

## 平成 28 年度実施主任研究員の研究業績レビュー（中間）の結果について

主任研究員、准主任研究員及び上席研究員研究業績評価実施細則(平成 28 年 4 月 28 日細則第 46 号)に基づき主任研究員の研究レビュー（中間）を実施し、レビューアーから事務局に送られた評価結果を取りまとめ下記のとおり報告いたします。

### 1. 評価対象： 望月 敦史主任研究員

#### 1) 評価体制

実施日：平成 29 年 3 月 30 日（木曜日）

4 名の所外有識者を評価委員とするヒアリングレビューを実施。

評価者：

Gheorghe CRACIUN, Professor  
University of Wisconsin-Madison

Shinya KURODA, Professor  
The University of Tokyo

Masayasu MIMURA, Professor  
Meiji University

Masaki SANO, Professor  
The University of Tokyo

#### 2) 評価結果の概要等

*General comments:*

#### **【Reviewer 1】**

The goal of Dr. Atsushi Mochizuki's lab are 1) solving biological problems using mathematics and 2) developing new mathematical method for biology. It is remarkable that he well-organizes these two goals together. His study includes network structure analysis, dynamic regulation and pattern formation. For each of the project, he has been productive and discovered new aspects of biology and developed new mathematical approaches. Moreover, the most impressive achievement is that every theoretical study has close association with experiments. This is surprisingly exceptional in the field of theoretical biology field. In addition, he is also good at lab management including human personnel development, and produces talented post-doc and students for academic and business fields. In conclusion, he has been very successful in science, lab management and personnel production, and greatly contribute the field of theoretical biology.

## **【Reviewer 2】**

### **Research objects**

In most of biological systems, many elements are complicatedly interacted in order to create new functions or morphogenesis. It has been expected that theoretical or mathematical biology to be able to do its elucidation in mathematical or theoretical understanding ways. I believe that the mission of this laboratory is to carry out this task, and to fulfill it, this laboratory is undoubtedly one of the top international classes.

### **Research results**

Generally speaking, there is an invariant principle or universality in physical systems. However, such a principle can not be ( or has not yet been) found in most of biological systems. Therefore, interdisciplinary collaborative research, which involves modeling with experimental people and analyzing with mathematicians, is needed. I should say that this laboratory has advanced this research so far, and the results there are great impact not only on experimental science but also on mathematical ones.

### **Management of the Laboratory**

This laboratory is a rather small size consisting of the chief scientist with three senior members and several postdoc young ones. Nevertheless, their productivity in research has been increasing under the leadership of the chief scientist.

### **Future research plans**

The importance of theoretical research to biological systems is how to contribute to unsolved problems in the experimental biology. For that purpose, further interdisciplinary research with both experimental science and mathematical sciences should be required. I am strongly convinced that the enthusiasm from this laboratory is sufficient.

### **Overall assessment**

I think that the laboratory will be given high enough rating.

## **【Reviewer 3】**

### **Research objectives**

The main research objectives of the Theoretical Biology Laboratory (led by Chief Scientist Dr. Atsushi Mochizuki) are to develop theoretical and mathematical methods that help us understand key mechanisms for biological systems.

### **Research results**

Dr. Atsushi Mochizuki, together with the other members of the Theoretical Biology Laboratory have created powerful methods for understanding how complex interacting systems generate important biological functions, such as homeostatic regulation, pattern formations and adaptive behaviors.

### **Management of the Laboratory**

Dr. Atsushi Mochizuki has been very successful in attracting and training excellent junior researchers, and mentoring them towards strong research work and successful future careers in research and academia.

### **Future research plans**

Dr. Atsushi Mochizuki has developed very successful research projects that involve the members of the Theoretical Biology Laboratory, as well as important collaborative projects with other researchers from Japan and from other countries, and he will further develop these projects in the future.

### **Overall assessment:**

Dr. Atsushi Mochizuki is a very successful leader of the RIKEN Theoretical Biology Laboratory. Under his leadership, the Theoretical Biology Laboratory has developed a very powerful, internationally recognized research program.

#### **【Reviewer 4】**

##### **Research objectives**

There is a growing need for theoretical biology. It is appropriate and ambitious for Dr. Mochizuki to set two-pronged strategy of solving each biological problems one by one and developing new theories/methods for biology. The former target will be useful for collaborations with experimentalists. The latter target is also a requisite for making innovative researches in the field.

##### **Research results**

Dr. Mochizuki and collaborators have developed mathematical theories on the existence and stability of attractors in gene regulatory network systems. Usefulness of the theory has been tested in an experiment. The series of works is excellent.

Management of the Laboratory: Dr. Mochizuki is organizing a group of the size proper to communicate and diverse enough in subjects as well. Dr. Mochizuki is providing a good atmosphere in the group with keeping scientific productivity.

##### **Future research plans**

There will be possibilities of cooperation with experimental groups in RIKEN as well as with experimental or theoretical groups in universities. Especially, collaborations with universities will be useful to attract students and young researchers toward the cutting edge of the research in this field.

##### **Overall assessment**

As an overall assessment, theoretical biology laboratory is performing excellently and leading a major part activities in theoretical biology in RIKEN.

以上