

**Interim Review Report**  
**Initiative Research Scientist**  
**Song Changyong**

Kohei Tamao, Chair  
Initiative Research Scientist Program Promotion & Review Committee

In accordance with Article 13 (Evaluation) of the RIKEN Regulations for the Initiative Research Unit Program which requires that all Initiative Research Units undergo review after 3 years, an interim review has been made of the Song Initiative Research Unit (opened in April 2006).

1. Research topic: Atomic Resolution Coherent X-ray Diffraction Imaging utilizing the Japan XFEL
2. Contract period: March 1, 2008 to February 28, 2013
3. Review date & time: November 17, 2011, 13:00–17:05
4. Review committee members:
  - Chair Kohei Tamao, Director, RIKEN ASI
  - Deputy Chair Masaki Takada, Deputy Director, RIKEN SPring-8 Center
  - Members Yoshiyuki Amemiya, Professor, Graduate School of Frontier Science, University of Tokyo
  - Masayoshi Nakasako, Professor, Department of Physics, Faculty of Science and Technology, Keio University
  - Akira Yagishita, Professor, High Energy Accelerator Research Organization (KEK)
  - Naoko Imamoto, Chief Scientist, ASI
  - Toshihide Kobayasi, Chief Scientist, ASI
  - Katsumi Midorikawa, Chief Scientist and Deputy Director, ASI (email review)
5. Review program
  - 1) Part 1 Research report session (public lecture at Kamitsubo Hall)

13:00–13:10	Greetings and background information	Tamao
13:10–13:55	Research report	Song
13:55–14:30	Q&A	

The review committee chair opened the session with words of greeting and a brief description of Initiative Research Scientist Song's background. This was

followed by a presentation made by Song on his unit's research and a Q&A session with the committee members. This first part of the review process ended earlier than scheduled. (RIKEN internal website notice and poster for the presentation)

2) Part 2 Laboratory tour and discussion with review committee members (closed session)

14:45–15:15 Lab tour and discussions with lab members

15:35–16:35 Discussion: review committee members and Initiative Research Scientist Song

16:35–16:50 Discussion: review committee members and Harima Institute Director Ishikawa

16:50–17:05 Closed session of review committee members only

The second session of the review consisted primarily of discussions among the review committee members, the Initiative Research Scientist, and the director of the Harima Institute. The comments of the individual review committee members which were later submitted to the review committee chair are attached to this report. These comments are based on the *Review Criteria* distributed to the committee members prior to the review.

**Initiative Research Scientist Song**  
**Interim Review Report**  
**(with comments from individual review committee members)**

1. Research results

Initiative Research Scientist Song has been working primarily on technology and equipment development related to SPring-8 and XFEL coherent imaging, making full use of his experience in his former position at UCLA with coherent diffractive imaging (CDI). He has taken the technology further to undertake the challenge of 3D-imaging on the atomic level of living biological molecules, and has already published four papers on the subject in high-impact journals. His achievements are superior and he has opened the way to a whole new world of photo science. It should be specially noted that he has received speaking invitations from 17 international symposiums and workshops over a period of just three and one-half years, an indication that Dr. Song is becoming internationally recognized.

Dr. Song has played an important role in developing research using SACLA, and can be expected to continue in this role. His contributions to joint experiments using SACLA have been major.

2. Research management and interaction with other researchers

The Song Initiative Research Unit is small, consisting of 1 research scientist, 2 special postdoctoral researchers, 1 IPA student, and 1 part-time Japanese technical assistant. The laboratory is well organized and highly efficient. There are no management problems of note. Overall the laboratory is well-managed and has a good atmosphere.

3. Future research directions

Japanese corporations have very high standards of research, and the expectation is that world-leading achievements should be possible through joint research with Japanese industry. This will require not only the efforts of the Song Initiative Research Unit researchers, but also guidance and advice from those around them.

Special note should be taken of the unit's joint research with ASI Chief Scientist Imamoto and her team. In the work with biological materials, it will be important to encourage further opportunities for free interaction with other researchers in biology-related fields.

Currently, Song's laboratory is located at the edge of the XFEL building and is

geographically independent from other labs on the Harima campus. The Harima Institute, however, is planning to consolidate all the labs next fiscal year. This change should improve the research environment and open up new opportunities to communicate with biologists.

#### 4. Recommendations

Dr. Song is invaluable to the future development of the Harima Institute and we have great expectations that he will become the leading scientist in the use of SACLA.

It is to be hoped that he will take the initiative to forge close ties with SACLA R&D groups inside and outside Japan and expand the possibilities for joint research.

In discussions regarding Dr. Song's career options after the completion of his current term, Harima Institute Director Ishikawa, who is also Dr. Song's advisor, has suggested that Dr. Song is a candidate to become a team leader for advanced research using SACLA.

Given Initiative Research Scientist Song's age, abilities, and management skills, the position of XFEL team leader is the best choice for him and the review committee fully supports this view.

*Attachment: Mid-term Review Report on Initiative Research Scientist, Song, Changyong*