

## International evaluation report for Global Institute for Materials Research Tohoku: GIMRT

GIMRT has certified as one of 6 International Joint Usage/Research Center in November 2018 and the international advisory and steering committee was asked by IMR director to provide an evaluation report for the activity in FY2021-2023 based on five key questions as below.

### Summary

1. GIMRT offers highly effective opportunity for international collaborations through a portfolio of well-thought programs and contribute to the formation of an international collaborative research hub in materials science.
2. GIMRT organizes various meetings to generate new ideas and possible collaborations. GIMRT provides domestic and international users with access to unique facilities in IMR.
3. GIMRT offers a unique platform to cover several sub-areas of ideas to be explored under one umbrella. GIMRT is unique in providing not only a specific instrument but a wide range of experimental facilities aimed at solving scientific ideas of researchers. The success of GIMRT is due to the high level of scientific expertise of IMR staff, who help and support the researchers.
4. The number and quality of publications resulting from the collaborative research within the GIMRT programs is quite impressive.
5. There are several excellent GIMRT programs dedicated to young researchers.
6. GIMRT offers a user-friendly application process and a fast and efficient review process. GIMRT managers are also quick to communicate various matters to researchers.

### Recommendations

1. The presence and the activity of GIMRT should be spread and announced more to international community
2. It would be good if there is an initiative to more actively encourage new collaborators and young researchers to join the program.
3. It is desired that the budget for the international collaboration and support staff will be increased.
4. It is desired to further increase the active support for young researchers. It is a good idea for IMR to offer Dual Degree Doctorate (DDD), which can enhance the collaboration with scientists from abroad.
5. It is important to seek the views of young researchers about the issues of GIMRT to further improve the program.
6. It is useful to link the global activities of GIMRT with those of other institutes for materials science, for example, Institute for Molecular Science and Institute for Solid State Physics.

### Request

1. Prepare the comparison table to show the differences from other international programs.

On behalf of the committee

Date

June 11/2024

Name in print, signature

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## **Result of the evaluation**

### **Evaluation Item 1**

Has GIMRT contributed to the development of the international collaboration in materials science and related community? Is it effective to coordinate the collaboration among IMR, oversea and domestic researchers?

**Rating 100 % (calculated by number of yes/number of answer)**

Yes 16/16

#### **1. GIMRT programs offer highly effective opportunity of international collaborations through a portfolio of well-thought programs**

- The ease of implementation of collaborative research ideas using the GIMRT program's opportunities has immensely helped in developing high impact research results worked out under the international collaboration.
- GIMRT has been providing many great opportunities by setting and achieving various programs for enhancing international collaborations.
- GIMRT is a remarkable organization bridging IMR to overseas and domestic researchers through a portfolio of well-thought programs.
- Based on the results achieved so far, I am very satisfied with the progress.
- GIMRT is well-organized and provided the good opportunity and financial supports to promote international collaboration to accomplish cutting-edge research for oversea and domestic researchers. GIMRT made large efforts by proposing various programs (types S, B, O, and COVIS) to promote the international collaboration. GIMRT has effectively contributed to internal collaboration.
- It is impressive that GIMRT offers a variety of and flexible programs of supporting researchers for collaboration, for example, a single visit program, bridge program among IMR, domestic institute, and overseas institution, and a combination of long and short stays of supervisors and students. GIMRT has surely contributed to research collaboration.
- Examples of Covis is typical evidence of such international collaboration.

#### **2. GIMRT contributes to form international collaboration hub of materials science**

- Unlike other research fields, international collaboration within materials science communities across the globe is somewhat limited. In this situation, GIRT stands out as it has established various programs and initiatives to facilitate joint research projects and a short- or long-term visit as well as organized conferences and workshops. GIMRT's commitment to international collaboration is truly beneficial to our communities.
- GIMRT is highly effective in developing international collaboration in materials science and build the community by helping Japanese and international scientists meet, perform experiments together and share knowledge.
- GIMRT has effectively coordinated collaboration among IMR, overseas and domestic researchers by acting as central hub. Moreover, GIMRT's initiatives to provide financial support for collaborative research have alleviated many of the barriers associated with international cooperation. The figures presented in different meetings I attended show the crucial role of GIMRT in creating and supporting international collaborations all along the different centers and divisions of IMR. I think that IMR acts as a catalyzer not only for the IMR staff but also for other research groups along Japan (domestic).
- The fact that it possesses special equipment and facilities that are worthy of worldwide attention is considered to be a sufficient contribution to the development of international collaborative research. Further development can be expected by advertising the possibility of its use more widely.

#### **3. GIMRT organize meetings to generate new ideas and possible collaborations**

- GIMRT and especially the summit on materials science provides a valuable platform to interact with top scientists from Tohoku IMR. It allows to generate new ideas and possible collaborations on (in our field of interest) irradiation effects in materials.

- It is also important that GIMRT spent a relatively large amount of money (10 % of the budget) to support the international and domestic workshops, which is quite effective to find new seeds of collaboration. As a whole, GIMRT programs highly contribute the collaboration in material science.

## **Recommendations**

### **1. The presence and the activity of GIMRT should be spread and announced more to international community**

- I just wonder how well this program is known internationally. There may be potential researchers who could benefit from this program and contribute to impactful results.

## **Evaluation Item 2**

Do GIMRT's programs open for researchers in both domestic and oversea institutes? Does the program offer the access to IMR's unique facilities and the activities?

## **Rating 100 %**

Yes 16/16

### **1. GIMRT's programs provide domestic and interactional users with access to unique facilities**

- The program does indeed offer access to IMR's unique facilities such as the cryogen free magnets, neutron instruments with world leading polarization capabilities.
- GIMRT programs are certainly open to researchers both in Japan and abroad as testified by the number of researchers using excellent IMR facilities every year.
- GIMRT has been conceived to offer access to IMR's facilities to scientists in Japan and around the world.
- IMR infrastructure can be accessed thanks to interactions with the responsible IMR staff at GIMRT activities.
- GIMRT's programs provide domestic and interactional users with access to unique facilities, including the high magnetic field lab, the supercomputer center, and neutron scattering instruments at JRR-3 and J-PARC. The number of the domestic and international users is being increased gradually.
- GIMRT ensures that its programs are accessible to both domestic and overseas institutions by actively promoting participation from researchers. GIMRT attracts researchers seeking to utilize cutting-edge instrument and infrastructure that are available at their home institutions.
- HFLSM, CCMS, and CN centers offer the unique and important research resources in facilities for domestic and international joint research.
- IMR has various unique facilities, which contribute to academic research by various researchers.

### **2. The success of the GIMRT programs is due to the high value scientific expertise of the IMR staff and they availability to help and support the researchers from domestic or overseas.**

- The experience of the last years shows that the combination of single and team visits (long and short term) with multi-core research collaborations is indeed attracting the exchange of visitors and promoting collaborations.
- The success of the GIMRT programs is due basically to two important issues: i) the unique facilities open and available at IMR and ii) the high value scientific expertise of the IMR staff and they availability to help and support the researchers from domestic or overseas in their investigations.
- GIMRT's programs semi-opens for researchers in both domestic and oversea institutes by the collaboration with research groups in IMR.

## **Recommendation**

### **1. It would be good if there is an initiative to actively encourage new collaborators and young researchers to join the program.**

- The GIMRT programs are open for both domestic and overseas institutions. However, it is clear that the domestic institutions know better the programs and therefore they use more frequently the programs. Perhaps, it should be necessary some more publicity of these programs along the different overseas institutions.
- I understand that collaboration by GIMRT is conducted not only with domestic institutes but also with overseas institutes. However, the ratio of the international collaboration in terms of the number of researchers are only 25 % and a half of them are from Asian countries, but only 14 % are from the US. I guess that many collaborations originally arose from the personal relationship of researchers in IMR and that is why many collaborations are with specific countries. There is a difficult aspect regarding activities. It is understandable that programs must be based on the development of existing joint research. It would be good if there is an initiative to actively encourage young researchers to use the program when there is a change of old and new researchers.
- The GIMRT programs are basically very open-minded ones to the world; so I think there are some more chances to enlarge the network.
- The GIMRT program is open to everyone. However, it would be beneficial to provide the newly created GIMRT introduction materials to researchers who have previously participated in joint research programs with IMR.

### **2. It is desired that the budget for the international collaboration will be increased.**

- The recent increase in airfare may pose a challenge to further promoting the international collaboration. It is desired that the budget for the international collaboration will be increased.
- To further strengthen the activities, it is advisable to increase the number of collaborations with countries with which there have been few collaborations in the past. It may be a good idea to make the domestic travel and international travel (including that from Japan to overseas) of the equal amount in budget, which is now 30 % and 20 %, respectively.

## **Evaluation Item 3**

Did GIMRT programs produce important scientific and technical outputs? Have the collaboration programs been useful for such activities?

### **Rating 100 %**

Yes 16/16

### **1. The number and quality of publications resulting from the collaborative research within the GIMRT programs is quite impressive.**

- The GIMRT program has produced many high profile papers and technical development often driven by the idea of the user and made possible by the equipment and expertise of the IMR scientists.
- Yes, in our collaboration with IMR group, we could and we still continue to publish in several high impact journals.
- Unique results are reflected by publications
- The number and quality of publications resulting from the collaborative research within the GIMRT programs is quite impressive.
- This can be measured for instance by a few high-impact publications from the last years.
- The GIMRT program has contributed to produce high profile research results.
- The figures on the scientific and technical outputs shown by the different divisions and centers of IMR are exceptional. It is observed also that the number of publications with international authors is progressively increasing in the last years. It is important to remember at this point that for example many times the delay between the realization of experiments and the publication of the results is typically of 18 months or even more in the case of experiments at large scale facilities.
- Many important scientific and technical output have been produced. It is always

impressive that scientific output from IMR based on GIMRT programs is with high quality.

- Considering the publication results, etc., it can be judged that the program is sufficiently useful.
- I think the GIMRT programs have been contributing some important scientific and technical outputs in materials science fields.
- In my research field, the results of UTe2 and those using high magnetic field are the two world-leading ones. I hope that through the activities of GIMRT, IMR will maintain competitiveness in these research field.

## **2. Excellent equipment, along with outstanding personnel, make collaborative research more efficient.**

- Excellent equipment, along with outstanding personnel, make collaborative research more efficient.
- The programs offered by GIMRT have undeniably led to important scientific and technical outputs, which would be impossible without specialized equipment and environments. demonstrating the deep impact of collaborative research. The collaborative nature of the programs has been pivotal in enhancing the quality of published journals by accessing IMR's unique facilities.
- The collaboration programs are able to bring to IMR new scientific ideas, led by external scientist, that will produce publications that will count for IMR. Without these programs such publications will never be done and never will increase the figures of IMR.

## **3. Fostering young generation**

- I hope. The experiences of international collaboration for young researchers are very important for scientific activities in the next generation.

### **Evaluation Item 4**

Have GIMRT programs offered substantial support for young researchers? Have the programs helped the growing of young researchers?

### **Rating 100 %**

Yes 16/16

## **1. There are several excellent GIMRT programs dedicated to young researchers.**

- GIMRT places a strong emphasis on helping young scientists succeed in their research. For young scientists in Japan, there is special funding allowing them to visit IMR facilities for long and short visits. There is also funding to allow them to travel overseas, to perform Research at Overseas Institutes. Foreign young scientists are also welcome to apply to visit IMR facilities under the single visit, bridge visit and co-research visit schemes. In addition money is available for workshops with young people encouraged to apply for money to organize a workshop and in practice the number of young people giving talks is high e.g. 45% at the 6th Summit of Materials Science 2023.
- There are several excellent GIMRT programs dedicated to young researchers. The level of support of young researchers is impressive.
- GIMRT has for instance a dedicated program for young researchers in Japan offering travel support to visit overseas institutes for research collaboration. This is a very successful program that has funded already many visits.
- One important aspect of the GIMRT program is to educate young students/researchers and promote young researchers' activities.
- Our group's young researchers have benefited from it in the past.
- There are special categories to promote young researchers' activities in the GIMRT program.
- GIMRT has several programs that support for early-career scientists. Unlike the senior researchers, a long-term visit program will be beneficial to help their professional growth. I do not have the real figures distributed by age of the applicants. However, it is my impression,

also supported by my interactions with other Japanese colleagues, that the number of young researchers and PhD students, mainly from Japan, is increasing over the last years.

- Some workshops were organized by young researchers. Covis is also a unique program that engages young researchers in international collaborative research.
- I hope. The experiences of international collaboration for young researchers are very important for scientific activities in the next generation. Actually, young researchers are growing at IMR.

## **Recommendation**

### **1. IMR to explore the possibility to offer Dual Degree Doctorate and Student Support Program**

- In this line, I propose the managers of IMR to explore the possibility to offer Dual Degree Doctorate “DDD” programs in collaboration with scientist from abroad. These programs could foster collaborations between IMR and Overseas scientists, and could help also to increase the number of young researchers.
- We hope for active support for young researchers in Japan. The number of young academia-oriented researchers in Japan is seriously declining. It would be good to enhance research support programs for students.

### **2. Increase the interaction between young researchers and various researchers in the program**

- Maybe young researchers should be more represented and given opportunity to interact with domestic and international experts during the GIMRT and summit on materials science.
- I understand the GIMRT programs offer various financial support for young researchers to conduct collaboration, for example, research fellowship. Also, many young researchers have been encouraged to participate in the meeting at IMR in Nov. 2023, which is good. Nevertheless, these are a kind of activities that any institutes make, and I wonder if a more specific program that really focuses on growing young researchers can be conducted in GIMRT program. I myself do not have a specific idea now, but for example, in relation to the comment to item 5, since IMR have a wide range of activities in material science, it may be possible for the young researchers to visit facilities that are quite away from their expertise and learn a different types of experiments.

### **3. Take the opinion of young researchers**

- I do hope so, and it may be a good idea to directly ask the young researchers regarding the effectiveness (and issues if there are) of the GIMRT programs.

## **Evaluation Item 5**

What are the quality and the level of the GIMRT program in comparison with other international programs? Do GIMRT programs have uniqueness in the international view point?

### **Rating 94 %**

Yes 15/16, No 1/16

### **1. GIMRT offers a unique platform to cover several sub-areas of ideas to explore, under one umbrella**

- Other than some international Beam-line facilities in Europe, UK, France and also in India (IUAC), I believe, the GIMRT offers a unique platform for international collaboration where a wide range of research facilities in the area of Materials Science & Engineering facilities are offered and thus covers several sub-areas of ideas to explore, under one umbrella.
- GIMRT definitely puts the unique facilities of Tohoku University in the international community.
- The uniqueness of GIMRT lies in bridging user facilities in Japan with scientists around the world
- I am not so familiar with “other international programs” (honestly speaking, I do not quite understand what it means), but the quality of research in IMR based on GIMRT program is one of the best in the world. Regarding the uniqueness, my understanding is such that,

compared with other institutes on material science, for example, ISSP in Univ. Tokyo, IMR covers a wider range of research areas in material science. I hope that GIMRT program will take the advantage of such uniqueness of IMR.

- The quality of the research is judged to be high and unique. The high international reputation of the institute can be judged from the fact that its original equipment and facilities are fully utilized.
- The scientific quality of the GIMRT programs is one of the sophisticated ones in materials science fields.
- The GIMRT programs are very useful to promote international collaboration in the field of materials sciences.

## **2. GIMRT provides not just a range of experimental facilities but also collaboration**

- I do not know of any other program that is similar to GIMRT. What makes GIMRT special is that it is open to both national and international research scientists, based purely on the merit of the scientific idea and provides not just a range of experimental facilities but also collaboration, know-how and exchange of ideas. Large scale facilities such as neutron and synchrotron facilities do provide open user access for specific instruments, but GIMRT is unique in providing this for a wide range of experimental techniques with the goal of solving a scientific idea rather than just one aspect of it. The other unique feature is the emphasis on collaboration with the Japanese hosts and sharing of knowledge.
- The GIMRT program promotes international collaborations in varieties of fields in materials sciences. I think that the wide variety of collaborations is unique. Bridge (Type B) is a unique category to promote collaborative research between multiple institutes and universities.
- The uniqueness of GIMRT programs is designed to facilitate seamless collaboration between researchers from various countries from the viewpoint of easy access to IMR's facilities and generous financial support. GIMRT's offerings are highly valued in the international materials science community.
- GIMRT program is unique as far as I know. It offers to the scientific community, in all the disciplines of the materials science and physics of the condensed matter, a wide suit of high level unique experimental equipment. More importantly is the possibility to use all this equipment in a "service" style but supported with a high-level scientific expertise.
- What makes GIMRT unique is the high caliber of researchers affiliated with IMR.

## **3. Easy to apply for the GIMRT programs and the managers are also fast in communicating how to access and use the GIMRT programs.**

- Managed by research-specialized organizations like IMR rather than government agencies, we can conduct unique and substantive collaborative research
- Moreover, it is easy to apply for the GIMRT programs and the managers are also fast in communicating how to access and use the GIMRT programs.
- The quality of the GIMRT programs is certainly at the top level as compared to other collaborative programs. I would like to particularly mention how easy it is to apply for different GIMRT programs. The review process is also fast and efficient.

### **Request**

#### **1. Prepare the comparison table to show the differences.**

I could not feel such the uniqueness. If you have a concrete example, please prepare the comparison table to show the above differences.

### **Evaluation Item 6**

Other comments (if any)

#### **1. Management and coordination**

- Excellent efforts by Japan towards reaching higher research goals by combining international young and experienced minds.
- My personal experience participating in different GIMRT programs is very positive. I



appreciate excellent facilities I have used and a strict minimum of formalities and paperwork to be done. As a researcher, I want to continue collaborating with IMR on research projects

- GIMRT is an excellent center.

## **2. Increase of operational budget and support staff**

- Due to constraints on annual government budget, the number of researchers is decreasing. How are you trying to solve this critical problem?
- It would be beneficial to increase the number of staff scientists who support users, if possible.

## **3. Network with IMS and ISSP**

- In order to promote international collaboration, it is useful to link the global activities with those of other joint use institutes in the field of materials science such as IMS, ISSP@UTokyo, etc.