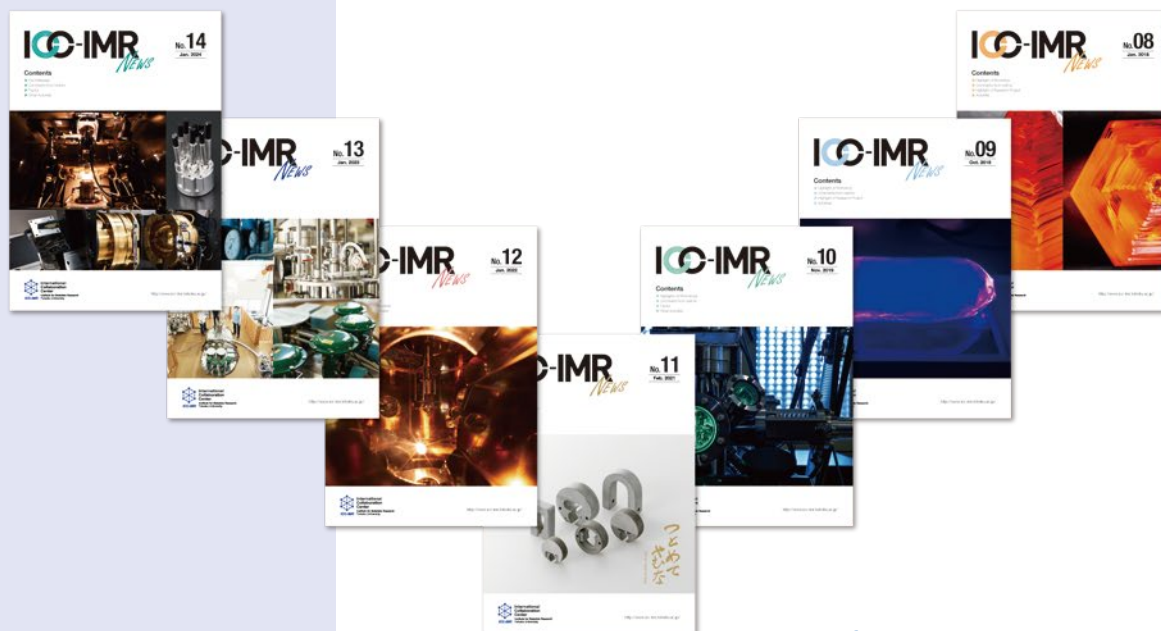


No. **15**  
Jan. 2025



# ICC-IMR NEWS



## Contents

- ❖ Top Message
- ❖ Comments from Visitors
- ❖ Topics
- ❖ Other Activities



**International  
Collaboration  
Center**  
Institute for Materials Research  
Tohoku University

<https://www.icc-imr.imr.tohoku.ac.jp/>

# Top Message

IMR hosts a diverse group of international researchers and students annually, drawing visitors from a wide range of countries, each with its unique cultures, ideas, and histories. These cultural and systemic differences become particularly evident during overseas visits. For example, during a recent trip to China, I observed that mobile payment systems were more advanced than those in Japan. With a mobile phone, one can easily access trains, taxis, and shops. The QR code, originally developed in Japan, is now more widely utilized in China for various activities of daily life, which is particularly striking. Another example is the style of international conferences held in India. I attended a conference where the opening ceremony highlighted deeply ingrained traditional customs. This included a candle-lighting ritual performed by guests and representatives of the host, the draping of a stole around the neck of each guest as a gesture of welcome, and an opening of sealed abstracts, among other customs not typically observed elsewhere. This ceremony is considerably different from a more concise opening ceremony conducted in Japan. Furthermore, there are notable differences in how meetings are conducted: some follow a strict punctual schedule, whereas others adopt a more relaxed and flexible schedule. In summary, the most effective strategy is to trust in and adapt to the local customs of doing things and to go with the flow.

Through these experiences, we have realized that there are many aspects of life abroad that remain unfamiliar or cause anxiety. Similarly, it is likely that visitors from overseas who visit Japan will also experience concerns, doubts, and surprises, even regarding aspects that may be common in Japan.

At IMR, ICC-IMR, and GIMRT, User offices work together to provide comprehensive support for international visitors. It is important to anticipate possible questions and challenges and address them proactively. Such services are essential, enabling visitors to concentrate on their research, which ultimately leads to better results and stronger partnerships. Recently, various conflicts and incidents have occurred around the world, leading many to perceive the world as increasingly unstable. In such a situation, the most important thing is to foster mutual understanding and establish relationships based on mutual respect. In academia, a standard of facts and truth exists, which I believe serves as a fundamental basis for mutual understanding. In the same way, academic collaboration founded on mutual understanding will make our world better and safer.

ICC-IMR Director

**Hiroyuki  
NOJIRI**



## Comment from a Visiting Professor



**Soo-Hyun JOO**  
Dankook University, Korea

Since 2016, I had the pleasure of conducting research as an assistant professor at IMR until 2020, and each visit to IMR since my return to Korea has always been a great joy for me. During my one-month stay in Sendai starting in January 2024, I was able to continue my collaboration with Professor Kato, and I am particularly grateful for the support that allowed Jihye Seong, a master's student from my research group in Korea, to gain various new research experiences.

Our work continues the collaboration with Professors Kato and Wada, focusing on applying the Liquid Metal Dealloying (LMD) process to the development of heterogeneous bonding technologies with three-dimensional interconnected structures. While the LMD process, developed by Professors Kato and Wada, has been extensively studied in the development of various materials with three-dimensional interconnected structures, there has been relatively little exploration of its application in structural metals, particularly in alloys containing multiple elements. We successfully produced a microstructure with a three-dimensional interconnected structure using a quinary high-entropy alloy through the LMD process, and we are preparing additional studies for further enhancements.

Beyond these significant research advancements and experiences, I also thoroughly enjoyed the winter scenery of Sendai and Mountain Zao in Miyagi during the weekends, which created unforgettable memories for both me and my student. I would like to express my sincere gratitude to Professor Kato and everyone at IMR for providing us with this valuable opportunity.

## Comment from a Visiting Professor



Life in Japan was extremely pleasant for me and my wife because we enjoyed its peaceful atmosphere. Japanese people are respectful, discrete, and very helpful. They also are genuinely interested in foreign cultures. It was very enriching for us to visit the imperial cities, Tokyo and Kyoto, and also to spend more than a month at IMR in Sendai. Sendai is a human-size city with many nice features. It is possible to walk from IMR to most of the city facilities, train station, parks, commercial malls. Foreigners are warmly welcomed everywhere. Also, Sendai is a central place for traditional festivals. We were lucky to attend two such big events that gave us a deep feeling of the Japanese culture. Enjoying extremely refined cooking, especially the one based on raw fish,

also played a key role to introduce us to the Japanese culture. IMR is a famous research institute effectively organized in several research divisions concerned with different aspects of Materials Research. During my stay, I was enrolled in the Materials Property Division, more specifically in the Crystal Physics Laboratory of Prof. Kozo Fujiwara. I was awarded a personal visitor office that gave me the opportunity to host a number of scientific discussions with the team members. I also had the opportunity to give a series of lectures about the phase-field method applied to silicon solidification. During my stay, I really enjoyed the constant help of the team staff, researchers and secretary: many thanks to them all. We also benefitted from convenient housing very close to IMR.

Prof. Fujiwara's group is very active in a number of fields of Crystal Physics. Silicon solidification is one of his research topics that is also studied by our team in Marseille. During my stay at IMR, our goal was to identify experimental observations that still require strong input from modeling to be fully interpreted. We focused our interest on oscillating solidification modes observed at some grain boundaries, both in Sendai and in Marseille. Our goal was to obtain a full physical model for this phenomenon by combining analytical, numerical and experimental input. By now, this goal has been partly reached. We are currently exploring the influence of pinning of the groove bottom to complete our model.

## Comment from a Visitor



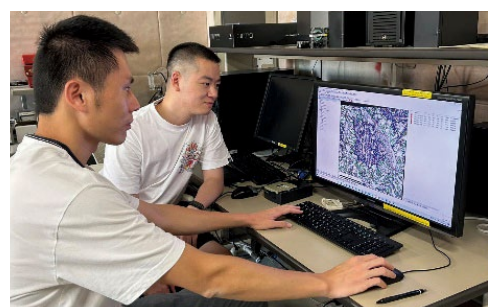
As a young researcher, I embarked on a three-month visit to Japan at the end of July this year. This experience not only enriched my academic horizons but also deepened my understanding of Japan's unique cultural and social atmosphere. I would like to express my heartfelt gratitude to my funder (ICC) for their support and trust. It is thanks to your financial assistance that I was able to successfully complete this important academic exchange.

During my visit, I was particularly impressed by the openness of the academic environment. I felt a strong encouragement from the emphasis Japanese academics place on innovation and collaboration, especially the support for young researchers. The atmosphere on campus encouraged in-depth exchanges between researchers from diverse countries and cultural backgrounds, fostering an open and inclusive academic community. This international inclusiveness facilitated the blending of different cultures, promoting mutual inspiration and the innovation of ideas. The university actively organized various

international seminars and academic exchange activities, providing an excellent platform for scholars from around the world to engage with one another, which highlights the importance and support for internationalization.

Japanese academia is known for its rigor, and the researchers demonstrated great professionalism in data analysis and experimental design. My interactions with them made me realize that a rigorous scientific attitude is key to advancing academic progress.

Additionally, I felt a strong commitment to academic integrity in Japan. During discussions, researchers not only shared their results but also openly acknowledged the limitations in their work. This emphasis on transparency and integrity deepened my understanding of research. In short, throughout my three-month visit, I not only gained valuable data but also invaluable experiences that will significantly advance my research on my topic.





## Summit of Materials Science (SMS) 2024 and Global Institute for Materials Research Tohoku (GIMRT) User Meeting 2024, November 27-28, 2024



**SMS2024 & GIMRT User Meeting 2024**  
Summit of Materials Science 2024 and GIMRT User Meeting 2024

**DATE** November 27<sup>th</sup>-28<sup>th</sup>, 2024  
**VENUE** IMR Auditorium, Tohoku University Katahira Campus  
**DETAIL** <https://www.sms2024.imr.tohoku.ac.jp/>

**INVITED SPEAKERS**

<b>Day1</b>	<b>Day2</b>
Roser Maria Valenti University of Valencia	Young-Kook Lee Korea Research Institute of Chemical Technology
Tetsuya Uda Nagoya University	Martin Luckenbauer University of Duisburg-Essen
Andreas Züttel ETH Zurich	Jean-Pascal Brison CNRS
Marie-Gabrielle Righi University of Strasbourg	Eun-Soo Park Korea Research Institute of Chemical Technology
Enri Minamitani Tohoku University	Kiyonori Suzuki Tohoku University

**CONFERENCE**  
2-3 Nakaya, Arima-ku, Sendai 980-8577, Japan  
TEL: +81-22-215-2079  
Institute for Materials Research, Tohoku University

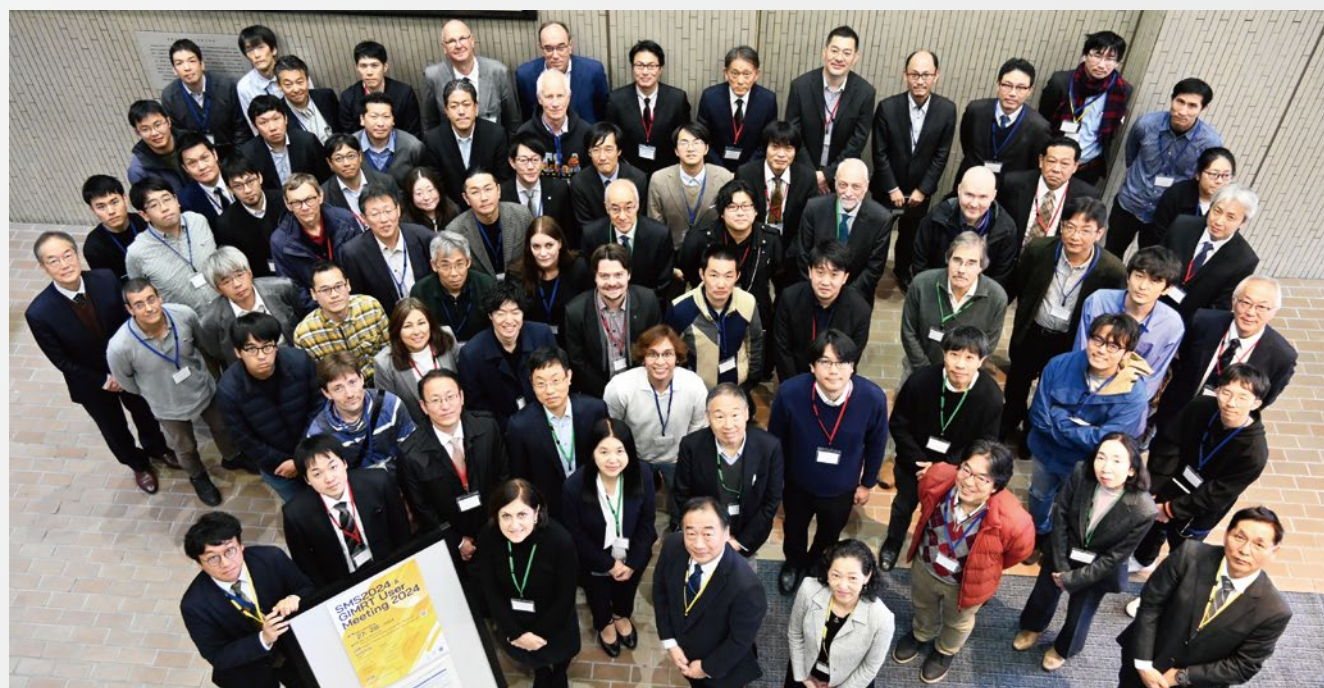
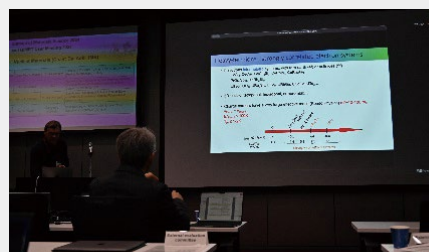
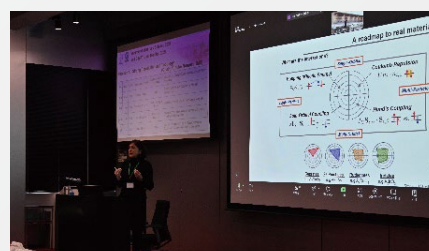
SMS2024 was successfully held at IMR auditorium with almost 300 participants (including online participants) in November 27 to 28.

The conference started with welcome greetings by Prof. Rie Umetsu, Deputy Director of IMR, and Prof. Takahiko Sasaki, Director of IMR.

27 presentations have been made in 7 sessions, “Strong Correlation and Topology”, “Energy Materials”, “Computational Materials Science and Informatics”, “Structural Materials”, “Nuclear Materials”, “Frontier in Metal and New Materials”, and “Functional Magnetic, Electronic, and Semiconducting Materials”. 8 speakers were invited from overseas, and many young researchers selected from GIMRT users were also invited. There were also reports from IMR faculties. Discussions were exchanged on the status of each field as well as on future perspectives.

In the 1st day, the poster session was held, and researchers and students presented their recent research topics.

The discussion was overflowing until the successive program, the Mixer, a lively discussion ensued. Next SMS is planned for 2026.



# ICC-IMR Activities in FY 2023

## ■ Visiting Professors



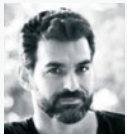
### Toni Helm

The Helmholtz Zentrum Dresden Rossendorf (HZDR),  
Germany  
April 1, 2023-March 31, 2024  
Angle-Dependent Magnetoresistance Studies in the Spin-Triplet Superconductor  
UTe<sub>2</sub> (Host: M. Kimata, IMR)



### Anna Kosogor

Institute of Magnetism, National Academy of Sciences of  
Ukraine and Ministry of Education and Science of Ukraine, Ukraine  
May 10, 2023-October 31 2023  
"Influence of the Chemical Composition on the Magnetocaloric Properties of  
Metamagnetic Shape Memory Alloys" (Host: R. Umetsu, IMR)



### Mohammad Saeed Bahramy

University of Manchester, UK  
June 16, 2023-August 7, 2023

"Modelling Emergent Quantum Phases in Two-Dimensional Materials"  
(Host: R. Belosludov, IMR)



### Jun-Sik Lee

SLAC National Accelerator Laboratory, USA  
June 21, 2023-July 20, 2023

"Developing Resonant Soft X-Ray Scattering Technique in Very High Magnetic  
Fields by Using Advanced Pulse Magnet Design"  
(Host: H. Nojiri, IMR)



### Ilya Sheikin

LNCMI, CNRS, France  
July 1, 2023-September 30, 2023

"Electronic Structure and Fermi Surfaces of Ce-Based Heavy-Fermion  
Compounds" (Host: D. Aoki, IMR)



### Michael Zhitomirsky

Interdisciplinary Research Institute of Grenoble (IRIG),  
CEA, France  
October 1, 2023-November 30, 2023  
"Phase Diagrams and Competing Interactions in Complex Triangular  
Antiferromagnets" (Host: H. Nojiri, IMR)



### Daniel Braithwaite

CEA Grenoble, France  
November 6, 2023-December 18, 2023

"Calorimetry in Miniature Diamond Anvil Cell" (Host: D. Aoki, IMR)



### Soo-Hyun Joo

Dankook University, Korea  
January 30, 2024-February 27, 2024

"Dissimilar Bonding via 3D Interconnected Structures of Liquid Metal Dealloying"  
(Host: H. Kato, IMR)



### Ilya Okulov

Leibniz-Institut für Werkstofforientierte Technologien (IWT),  
Germany  
March 1, 2024-March 29, 2024

"Design of Integrated Composite Electrode Composed of Porous Metallic Current  
Collector and Nanoscale Active Ceramic Material" (Host: H. Kato, IMR)

## ■ International Workshops

GIMRT Workshop: Resonant Inelastic and Elastic X-ray  
Scattering (RIXS/REXS), Sendai, 2023.8.2-2023.8.4

Organizer: M. Fujita, IMR

GIMRT Workshop: The 18th International Workshop on  
Biomaterials in Interface Science, Sendai, 2023.8.4

Organizer: H. Kato, IMR

GIMRT Workshop: Reimei-GIMRT Workshop "Quantum  
Beams Study of the Dynamics of Rare Earth Garnets",  
Sendai, 2023.8.7-2023.8.8

Organizer: H. Nojiri, IMR

KINKEN WAKATE 2023: International Materials Science  
School 2023-Advances in Strongly Correlated Electron  
Systems, Grenoble, France, 2023.10.9-2023.10.12

Organizer: D. Aoki, IMR

Summit of Materials Science 2023 and GIMRT User Meeting  
2023, Sendai, 2023.11.20-2023.11.22

Organizer: T. Sasaki, IMR

GIMRT Workshop: The 7th Symposium for the Core  
Research Clusters for Materials Science and Spintronics, and  
the 6th Symposium on International Joint Graduate  
Programs in Materials Science and Spintronics, Sendai,  
2023.11.28-2023.12.1

Organizer: S. Orimo, IMR

## ■ Major Publications

S. Ishizawa, S. Kurosawa, Y. Kurashima, S. Kodama,  
Y. Morishita, A. Yamaji, M. Ohno, S. Ishikawa,  
M. Hayashi, M. Sasano, T. Makita, C. Fujiwara,  
V. Kochurikhin, A. Yoshikawa, T. Takata, H. Tanaka

"Optical and Scintillation Properties of Yb-Doped La:HoF<sub>6</sub> Crystal Grown by Core Heating Method for  
Fiber Reading Remote-Dosimetry System", *Opt. Mater.* 142(2023) 113941

A. Zabala-Lekuona, A. Landart-Gereka,  
M. M. Quesada-Moreno, A. J. Mota, I. F. Díaz-Ortega,  
H. Nojiri, J. Krzystek, J. M. Seco, E. Colacio

"Zero-Field SMM Behavior Triggered by Magnetic Exchange Interactions and a Collinear Arrangement  
of Local Anisotropy Axes in a Linear Co<sup>II</sup> Complex", *Inorg. Chem.* 62(2023) 20030–20041II

W.-Y. Park, J. Han, J. Moon, S.-H. Joo, T. Wada,  
Y. Ichikawa, K. Ogawa, H. S. Kim, M. Chen, H. Kato

"Mechanically Robust Self-Organized Crack-Free Nanocellular Graphene with Outstanding  
Electrochemical Properties in Sodium Ion Battery", *Adv. Mat.*, 36(2024) e2311792

T. Helm, M. Kimata, K. Sudo, A. Miyata, J. Stirnat,  
T. Foerster, J. Hornung, M. Koenig, I. Sheikin, A. Pourret,  
G. Lapertot, D. Aoki, G. G. Knebel, J. Wosnitza,  
J. P. Brison, J. M. Jiang, C. R. Rotundu, C.-C. Kao,  
H.-C. Jiang, J.-S. Lee, Y. S. Lee

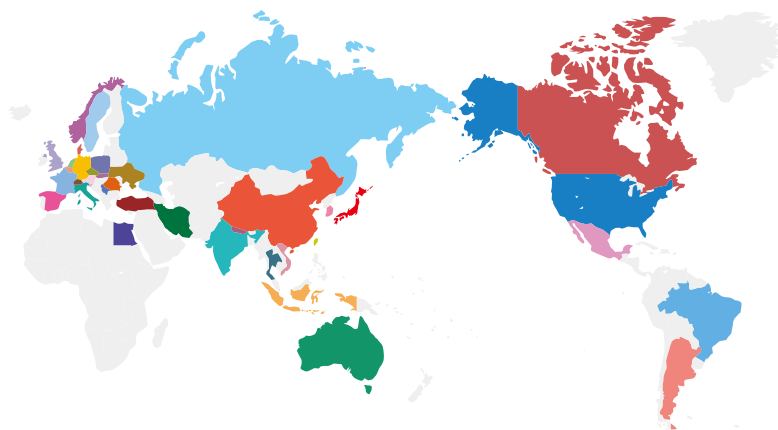
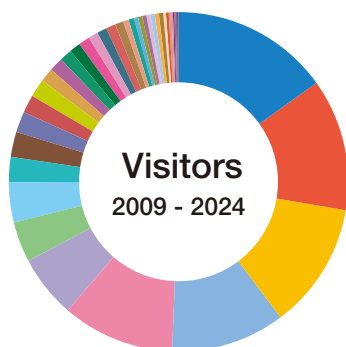
"Field-Induced Compensation of Magnetic Exchange as the Possible Origin of Reentrant  
Superconductivity in UTe<sub>2</sub>", *Nat. Commun.*, 15(2024) 37

S. Kodama, S. Kurosawa, K. Fujii, M. Yashima,  
A. Yamaji, A. Yoshikawa

"Structure Analysis and Luminescence Properties of Red-Emitting Iodide Scintillators with  
Potassium-Hexachloroplatinate(IV) Type Structure", *J. Alloy. Compd.* 970(2024) 172506



## Visitors supported by ICC-Programs



USA	114	India	18	Iran	8	Brazil	3	Romania	2
China	95	Switzerland	18	Spain	8	Czech Republic	3	Vietnam	2
Germany	91	Poland	15	Mexico	7	Slovakia	3	Argentina	1
France	82	Canada	13	Thailand	7	Slovenia	3	Egypt	1
Korea	81	Taiwan	13	Denmark	7	Sweden	3	Nepal	1
UK	45	Singapore	10	Hong-Kong	6	Indonesia	3	Serbia	1
Netherlands	29	Norway	10	Belgium	4	Ukraine	3	Turkey	1
Russia	29	Australia	9	Italy	4	Austria	2		

## ICC-IMR Programs

ICC-IMR was founded in April 2008 as the center for international collaboration of the Institute for Materials Research (IMR). As one of the centers of excellence in materials science, IMR holds 27 research groups and five research centers. ICC-IMR works as a gateway of diverse collaborations between international researchers and IMR members. ICC-IMR has invited 93 visiting professors and conducted 23 international research projects since the start-up. The applications are open for foreign researchers and the projects are evaluated by a peer-review process involving international reviewers. Currently, ICC-IMR coordinates five different programs:

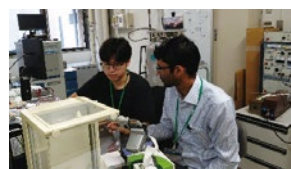
- 1 International Integrated Project Research**
- 2 Visiting Professors**
- 3 International Workshops**
- 4 Fellowships for Young Researchers and PhD Students**
- 5 Material Transfer Program**

We welcome applicants from around the globe to participate in these international programs.

## A New ICC-IMR/GIMRT Collaborative Program for Mid-term Stay

GIMRT's single visit proposal typically offers 2-3 weeks stay in IMR for collaboration research. ICC-IMR starts new program in collaboration with GIMRT to support up to 3 months stay for PhD students and young researchers. In the scheme, the 1st month is supported by GIMRT and then successive months are supported by ICC-IMR's fellowship.

The new scheme offers an enhanced opportunities of international collaboration together with the Covis (Co-research Visit), in which the GIMRT and the guest professor ships are combined. In FY2024, we had 7 covis, 1 Young Fellowship.



## Contact Information

Website : <http://www.icc-imr.imr.tohoku.ac.jp/>  
E-mail : [icc-imr@grp.tohoku.ac.jp](mailto:icc-imr@grp.tohoku.ac.jp)  
Address : International Collaboration Center,  
Institute for Materials Research, Tohoku University  
Katahira 2-1-1, Sendai 980-8577, Japan  
Tel/Fax : +81-22-215-2019

## On the Cover

On the occasion of the 15th issue of the ICC-IMR News, we have put together photos of the covers from the first issue to the past.

