

# Minutes of the IMI International Advisory Board Meeting 2025 (IAB2025)

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Date: Sunday, August 17, 2025

Time: 13:00–14:00 (KST)

Location: POSCO Center, Seoul, South Korea (Hybrid Format)

Participants: Kenji Kajiwara (IMI Kyushu University, Japan), Soon-Sun Kwon (Department of Mathematics, Director of Ajou center for mathematics and statistics in industry Ajou University, Korea), Konrad Polthier (Institute of Mathematics, Freie Universitaet Berlin and MATHEON, Germany), Philip Broadbridge (La Trobe University, Australia), Steve Taylor (Department of Mathematics, The University of Auckland, New Zealand), Wil Schilders (Centre for Analysis, Scientific Computing and Applications, TU Eindhoven / Mathematics for Industrial Innovation, TU Eindhoven / Platform for Mathematics in The Netherland, The Netherlands), Seiko SASAGURI (APCMfi Office)

## 1. Opening Remarks

Chair Kenji Kajiwara opened the meeting by welcoming all participants, both in person and online. He expressed his sincere appreciation for their continued support and collaboration with IMI. He announced the arrival of two new Assistant Professors: Dr. Kensu Kim, specializing in Topological Data Analysis, and Dr. Shota Shigetomi, whose expertise lies in Discrete Differential Geometry. Additionally, starting in March 2026, Dr. Takaharu Yaguchi, an expert in Numerical Analysis and Scientific Machine Learning, will join IMI as a Professor. The Chair also reported on recent departures: Prof. Yasuhide Fukumoto, former IMI Director, has retired; Prof. Katsuki Fujisawa, Prof. Yuichi Ike, and Prof. Takeo Uramoto have moved to other universities. Lastly, Prof. Pierluigi Cesana and Prof. Hayato Waki, have been promoted to Full Professors from their previous positions as Associate Professors.

The IMI management team is structured as follows: Director: Prof. Kenji Kajiwara; Deputy Director: Prof. Tomoyuki Shirai; Assistant Directors: Prof. Naoyuki Kamiyama, Prof. Shizuo Kaji and Prof. Fumikazu Sato. They will serve in their roles until September 2026.

## 2. Review of IMI Activities

The Chair provided a brief overview of IMI's recent initiatives and accomplishments across various areas. In terms of research grants, there were 10 projects with IMI members as Principal Investigators (PI) and 16 as Co-Investigators (Co-I), with a total funding amount of

91 million yen. For commissioned and joint research, IMI engaged in 38 projects totaling 133 million yen. In support of joint activities, IMI recorded 216 contacts with companies. The IMI Colloquium was held 9 times, with a total of 353 participants and involvement from 6 companies. The Industry Study Group had 84 participants, and 3 companies presented their challenges during the sessions. In terms of research output, IMI produced 83 research papers and received 10 awards, including 5 awarded to students. Regarding collaborative work, there were 4 joint research papers within IMI, 64 joint papers with external domestic institutions, and 22 joint international publications. Social contributions of IMI include the Nursery Arrangement Matching System established in 2017, the Smart Factory Project with a pharmaceutical company launched in 2022, and the Joint Transportation Matching System introduced in 2024. Internationally, Prof. Kenji Kajiwara continues to serve as a Member-at-Large of ICIAM. IMI academic staff conducted 44 interdisciplinary research projects, while students were involved in 47 such projects. Additionally, 20 networking events have been held under the MfIP initiative.

In the area of educational activities, IMI has been running the Joint Graduate School of Mathematics for Innovation since 2021, in collaboration with the Graduate School of Information Science and Electrical Engineering. The program currently has 56 students enrolled and is designed as a five-year integrated course. A distinctive feature of the program is its emphasis on long-term internships of approximately three months, during which students are required to engage in interdisciplinary research. The program recently underwent an intermediate evaluation and received the highest rating of "S".

In terms of international activities, IMI operates an Australian Branch that facilitates joint research projects, joint academic appointments, and collaborative online seminars. There is mutual participation in study groups and international conferences, and IMI actively encourages involvement in events such as the ANZIAM and MISG conferences. Prof. Hien visits IMI twice a year, delivering a series of in-depth lectures during each visit. Looking ahead, IMI aims to expand its international collaboration, with plans to strengthen ties with ASEAN countries, establish a Malaysian branch, and develop a range of robust joint activities in the region. APCMFI organized the Forum of Mathematics for Industry (FMfI) in Kuala Lumpur in 2024, and Prof. Kajiwara provided a brief report on the winners of the poster session held during the event. The next edition, FMfI 2025, begins this week in Seoul.

IMI operates a **Joint Usage Research Program** that supports a wide range of collaborative activities. In the domestic program, a total of 34 conferences were held, including 3 of general research type (I), 9 of type (II), 13 short-term joint research projects, 8 short-term visiting research projects, and 1 project research initiative. On the international side, IMI organized one major project: **FMfI 2024**. For 2025, a total of **36 projects** are scheduled to run under the program.

The **Study Group Workshop with Industry** for 2025 was held in July and was a great success. Three problem sessions were provided by **Murata Machinery**, and two by **Toshiba Corporation**. A detailed report on the outcomes is currently in preparation. This year's workshop attracted **93 participants**, including **49 students**.

Starting this year, IMI has established an Advisory Board to gather strategic input from industry and local society. The purpose of the board is to provide insights into emerging economic and societal trends, expectations for the role of mathematics, and future directions for industry-academia collaboration. The board is composed of high-profile members representing a wide range of sectors and expertise.

To support all of IMI's activities, a new division called the Strategic Liaison Division has been established. This division focuses on the organization and management of the institute and operates with three main functions: support for joint research, management of the MfIP program, and promotion of collaborative research practices. The division is led by Prof. Fumikazu Sato and has already become a very active and integral part of IMI's operations.

Last year, we announced plans to establish several new committees aimed at positioning IMI as a world-leading research institute. A total of seven committees were proposed. Among them, only one has been fully implemented so far: the committee focused on building a strong management system to support and enable the activities mentioned above. The remaining committees are still in progress. In particular, the initiative to invite and attract top international researchers through cross-appointments is currently in the planning phase.

There are several major projects underway at IMI. One is the Mathematics for Industry Platform, an all-Japan initiative that responds to society's needs for mathematics and comprises 17 participating institutes. Through this platform, IMI has organized 24 matching events and technical consultations at joint research meetings to facilitate collaboration between academia and industry.

Another key project is the large-scale industry-academia collaboration, which aims to expand the scale and impact of our partnerships. This includes several Joint Research Divisions, such as the collaboration with Fujitsu on mathematical modeling for decision-making. Starting this October, a new joint project with Sumitomo Wiring Systems will focus on next-generation manufacturing innovations for the automotive industry.

IMI has also strengthened its expertise by employing a professor through a cross-appointment with Toshiba. Additionally, IMI is involved in cutting-edge quantum technology research and is a member of the QSTAR Quantum Strategic Industry Alliance, which is dedicated to advancing revolutionary quantum technologies. Furthermore, the institute's **Bridge Program**, supported by the Cabinet Office, has been approved for funding of 15 million yen over three years.

Starting in 2025, the funding scheme has changed. Previously, there was a 30% overhead on direct costs, with a small portion allocated as incentives. Under the new scheme, direct costs are considered as intellectual contributions, and no overhead is applied. Additionally, direct costs can now be allocated to salaries.

The inauguration of the new division project follows a multi-stage selection process. It begins within Kyushu University, where 20 to 30 applications are submitted, then moves to the Ministry of Economy, and finally to the Ministry of Finance. At the final stage, only about five proposals are selected. We have been successful in this process, securing several new professor positions and associated funding so far. This year, we have proposed a new project currently under evaluation. Our proposal includes the establishment of a Division of Optimization and Quantum Mathematics, as well as a Division of International Affairs. We have requested nine full professor positions and substantial funding. While we do not expect all positions to be approved, we are hopeful that three to four professor positions and a portion of the requested funding will be granted. Based on ongoing negotiations with the ministries, we are optimistic that the project will receive approval. There is strong emphasis on the development of the new Malaysia branch, focusing on deepening liaison and collaboration at multiple levels, including academic and student exchanges as well as joint research projects. A highlight of this collaboration is the upcoming Malaysia-Japan Symposium on Mathematical Statistics and Modeling, which will be held on campus in August 2025. This event reflects the growing partnership and will be honored with a salute from the Minister of Malaysia, underscoring the importance and support from the Malaysian government.

The third major project is outreach, which plays a vital role in promoting mathematics and increasing interest among young people. It is essential to begin engaging students as early as junior high school. In December of last year, we launched a new outreach program aimed at fostering curiosity and enthusiasm for mathematics. As part of this initiative, we visited schools in the Osaka area, delivered three lectures, and distributed educational materials to 23 participants, including teachers. Our goal is to present mathematics as both challenging and interesting, making it more accessible and appealing. The feedback from students was very positive. Two similar outreach efforts were carried out in Fukuoka Prefecture, where we gave two lectures and received similarly encouraging responses.

### 3. Strategic Discussion

Board members discussed the following key topics:

- **Increased Emphasis on Statistical Modeling**  
There is a growing focus on statistical modeling, which is now essential due to IMI's close collaborations with industry partners.
- **Early Career Engagement and Student Involvement**  
IMI places strong emphasis on reaching early-career researchers and students to attract and encourage the next generation of mathematicians.
- **School Outreach in Fukuoka**  
A school in Fukuoka Prefecture contacted IMI through the Fukuoka Prefecture Education Agency, expressing interest in participation. This highlights the importance of visibility—advertisement is key for expanding outreach.

- **Budget Concerns and Funding Model**

Government funding is rapidly declining. IMI now operates largely through: Industry-based grants and Indirect budgets tied to research grants.
- **Artificial Intelligence vs. Quantum Focus**

Although AI is recognized as an important and rapidly developing area, IMI has chosen not to prioritize it directly. Instead, the focus is on:

  - Quantum mathematics and the software aspects of quantum computing
  - Development of fundamental algorithms in quantum computing
  - Preparing for a future in which quantum software becomes open-source
- **Need for Specialized Human Resources**

There is a significant need for trained engineers with deep expertise in: Quantum mechanics, Representation theory, Number theory. IMI is targeting this gap, as few institutions are addressing it.
- **Annual Report Translation**

Currently, IMI's annual activity report is published in Japanese. Starting next year, it will also be produced in English to increase accessibility and visibility.
- **Malaysia Branch – Clarification of Role**

The purpose of the Malaysia branch was clarified as follows:

  - Organize joint activities and research projects
  - Select postdocs and students for programs in Japan
  - Collaborate with companies
  - Plan to hire one staff member via cross-appointment in Malaysia
- **PhD-Level Human Resource Development**

Japanese companies have expressed a strong interest in hiring PhD-level personnel, but the domestic supply is limited. There is a particular interest in recruiting from Asia, with Malaysia being a key focus due to its talent pool.
- **Strategic Industry Relations**

IMI continues to build strong, strategic relationships with industry through:

  - Internships and collaborative programs for students
  - Maintaining approximately 200 industry contacts at various levels
  - Engagement at high levels, including the establishment of the IMI Advisory Board

- Global Collaboration: Strengthening partnerships with international institutions and researchers.
- Funding Opportunities: Identifying new sources of funding and improving grant application strategies.
- Talent Development: Enhancing programs to attract and support young researchers in mathematics and related fields.

- **Overall Assessment of the Report**

The report was well-received and described as impressive in scope and quality.

#### **4. Feedback and Recommendations**

Advisory Board members provided constructive feedback and suggestions:

- Encouraged IMI to increase visibility through international conferences and publications.
- Recommended more interdisciplinary projects involving data science and AI.
- Suggested establishing a mentorship program for early-career researchers.

#### **6. Closing**

Chair Kajiwara thanked all attendees for their valuable input and reaffirmed IMI's commitment to advancing mathematical innovation globally. The meeting was adjourned at 14:00 KST.