

# Technical Committee on Magnetism

## 1. Objective

The objective of this technical committee is to conduct research and development on magnetic materials, magnetic devices and sensors, and their systems related to magnetism and novel analysis schemes; collaborate with overseas academic societies and other fields; and investigate trends in the aforementioned fields.

## 2. Fields of activity

All magnetism-related technologies are targeted. Magnetism covers various areas (Fig. 1) on all scales, including power, frequency, and device size. Each area is considered to be an indispensable part of social life. Applications are related to energy, information and communications, equipment design, and medical care. Figure 1 Areas covered by the magnetism

## 3. Activity content

### 3.1 Technical committee

This technical committee sponsors the Technical Meetings on Magnetism and has established eight investigation committees on special area. Moreover, it actively conducts workshops and promotes initiatives, such as a new incentive system for mid-level researchers, before most countries do.

### 3.2 Technical Meeting on Magnetism

This Technical Meeting meets 15–18 times a year, addressing various fields of advanced magnetism. Technical Meeting is one of the most energetic activities in this technical committee. The members conduct joint Technical Meetings with other technical committees and departments. Prior to the COVID-19 pandemic, the technical committee held evening social events and supported the creation of cross-boundary exchange networks encompassing universities and industries, working adults, and students.

In addition, the committee has established an award system to provide a platform where people seeking to become next-generation leaders can play an active role.

### 3.3 Investigation committees on special area

Eight investigation committees have been established covering magnetism in general, the themes of which are divided into three categories: magnetic materials, devices and systems, and analysis technologies.

These committees investigate the development of magnetic materials, including that of magnetic materials

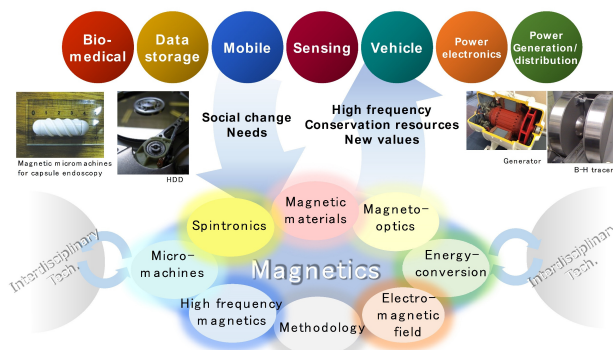


Figure 1 Areas covered by the magnetism

indispensable for industrial equipment, such as low-loss electrical steel sheets used in transformers and motors, thin-film materials with new functionality, and permanent magnet materials; they also analyze measurement and evaluation methods. In device and system-related areas, they investigate new devices and systems that meet real-world requirements, e.g., sensors, micromachines, microdevices, magneto-optical recording, and bio-action of magnetism. Moreover, they investigate analytical methods that account for nonlinear elements in magnetic materials and new functions emerging as a result of controlling and designing magnetic field distribution; they also analyze basic technologies.

#### **4. Introduction to activities**

##### **4.1 Technical Meeting results**

- Number of annual Technical Meetings: 14 (planned for fiscal year 2021)
- Number of papers published annually: about 200 (planned for fiscal year 2021)
- Cultivation of young researchers and technical committee-specific research incentive award

##### **4.2 International events (2015–2016)**

- Magnetics and Optics Research International Symposium (MORIS) held in Penang, Malaysia (December 2015)
- "Magnetic/Electromagnetic Environment/EMCJ Joint Technical Meeting" held in Taipei, Taiwan (June 2016)
- Co-sponsoring IEEE Magnetic Society Summer School at Tohoku University (July 2016)

##### **4.3 Research incentive award**

Young researchers (up to about 35 years old) who have delivered excellent presentations within the Technical Meeting on Magnetics are selected and awarded. This helps foster young researchers.

##### **4.4 Invited lectures (mid-level and corporate engineers)**

This system was originally created by the Technical Committee on Magnetics in 2017. It will include invited lectures at the Technical Meeting on Magnetics by mid-level researchers at universities, public institutions and industries who have achieved excellent works; the lectures will be on the paths to achieving the results, on the achievements, and on the prospects for the future. Young students and student members are stimulated by their research and life. Seniors cultivate a deeper understanding of the new fields and talent, which will be responsible for the next generation of magnetics.

In several cases, corporate and mid-level researchers will play a central role in R&D and academic activities. However, the award system for these researchers has been inadequate thus far. There are still only a few awards for mid-level researchers worldwide. Hence, the proposed initiative is the first of its kind.

## 5. Committee members

Position	Name	Affiliation
Chairperson	Toshiro Sato	Shinshu University
Primary member	Koichi Kondo	Token Corporation
"	Yoshito Ashizawa	Nihon University
"	Kazushi Ishiyama	Tohoku University
"	Satoshi Sugimoto	Tohoku University
"	Makoto Sonehara	Shinshu University
"	Yasushi Takemura	Yokohama National University
"	Kunihisa Tashiro	Shinshu University
"	Sachiko Yamaguchi	National Institute of Occupational Safety and Health, Japan.
"	Masahiro Yamaguchi	Tohoku University
Secondary member	Takashi Honda	Kyushu Institute of Technology
"	Tatsuya Doi	Ashikaga University
"	Kunihisa Tashiro	Shinshu University
"	Arata Tsukamoto	Nihon University
"	Yuji Tsuchida	Oita University
"	Masayuki Naoe	Research Institute for Electromagnetic Materials
"	Masaki Nakano	Nagasaki University
"	Yukio Nozaki	Keio University
Secretary	Yuki Sato	Texas Instruments Japan, Ltd.
"	Yota Takamura	Tokyo Institute of Technology
Assistant secretary	Loi Tonthat	Tohoku University
Observer	Gaku Obara	Meiji University
"	Katsuji Nakagawa	Nihon University

(October 31st, 2021)

## 6. Investigating R&D Committees

- Investigating R&D Committee on Research and Development Trends and Applications of Next-Generation Permanent Magnets
- Investigating R&D Committee on Development of Functional Materials Using Nanoscale Magnetic Materials
- Investigating R&D Committee on Magnetic Sensors and Machine Learning
- Investigating R&D Committee on Technology Using High Frequency Properties of Magnetic Materials
- Investigating R&D Committee on High Functionality Magnetic Device Technology Based on Optical–Thermal–Electrical Interactions
- Investigating R&D Committee on Technology Utilizing Power Magnetic Materials for High Performance Electromagnetic Equipment
- Investigating R&D Committee on Magnetic Application Technologies for Energy Conversion Systems for Carbon Neutrality
- Investigating R&D Committee on Challenging Magnetic Technologies for Next-Generation Healthcare