AIST REPORT 2024

Create the Future,
Collaborate Together

Sustainability Report

AIST

TOP MESSAGE

Transforming AIST to achieve its mission of “solving social problems and strengthening industrial competitiveness”

Transforming AIST into an organization that links research results to social implementation

The National Institute of Advanced Industrial Science and Technology (AIST) is currently undergoing a transformation, from an organization that only produces research results, to one that promptly and reliably implements said results in society. This is the consequence of our management reforms in various areas, including the research structure, organizational management, and the personnel system.

The first step in reform is to improve two-way trust and contribution, or engagement*1, between an organization and its staff. The most important factor for this is empathy for the organizational vision. In order to create an environment wherein all staff members share in the organizational direction and cooperate with each other in taking on the challenge of creating new value, AIST employees came together over a period of time to discuss and formulate the AIST vision:*2 “Create the Future, Collaborate Together.” This is a representation of the role AIST should play in the future for Japan and the world at large, and the kind of organization we as AIST should aspire to be for those who work in it.

AIST’s greatest asset is its human resources. In order to draw out the strengths of the researchers and engineers who devote their energies to research and development, the administrative and support staff who manage the institute, and the employees of AIST Solutions Co. (“AISol”)*3 who promote social implementation, the vision must be one which all members can “make their own.” We are confident that the AIST vision, created based on feedback from the field, will motivate employees and eventually lead to the creation of new value.

ISHIMURA Kazuhiko

President & CEO
National Institute of Advanced Industrial Science and Technology (AIST)

Becoming the core of a national innovation ecosystem with a mission to solve social problems and strengthen industrial competitiveness

Japan’s industrial competitiveness has been on a steady decline for more than 30 years. One of the major reasons for this is the lack of an innovation-generating ecosystem in Japan. I believe that the key to innovation is diversity. New ideas are born when a mix of people interact and diverse opinions are combined. Open innovation, such as collaboration between companies, and between companies and universities/research institutions, is effective in expanding diversity.

However, open innovation in Japan is sluggish compared to overseas. According to the “Science and Technology Indicators 2023,” issued by the Ministry of Education, Culture, Sports, Science and Technology, the total R&D expenditures by Japanese companies in 2021 was approximately 14 trillion yen, of which joint research expenditures with public research institutes and universities amount to around 100 billion yen, a mere 0.7% of the total. Compared to China (4.6%), Germany (6.3%), the U.K. (3.8%), and France (2.3%), these figures are overwhelmingly low, indicating that Japanese companies still have a strong tendency toward self-reliance.

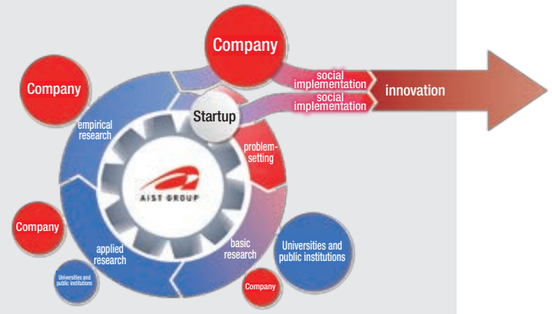
This may mean that not much is expected of public research institutes. We are very much aware of the danger that companies may not see AIST as a co-creation partner. In order to achieve the same level of open innovation as the rest of the world, both the companies tackling R&D head-on, and research institutes like ourselves must change.

AIST sets out a “medium- to long-term plan” every five years. In the current 5th Medium-to-Long-term Plan (FY 2020–FY 2024), our mission is to “solve social problems and strengthen industrial competitiveness.” We, the management team, have thoroughly discussed, and clearly presented our fifth management policy*4 for achieving this mission. The policy identifies our vision for FY 2030 and beyond as being “the core of the national innovation ecosystem.” The national innovation ecosystem is a scheme wherein innovation in Japan is continuously generated through collaboration and cooperation among various players in industry, academia, and government. In addition, backcasting from this vision of the future, we, in the 5th term, decided to build a prototype of the ecosystem and establish the AIST brand. By setting concrete action plans based on this management policy and steadily implementing them one by one, we intend to grow and advance the innovation ecosystem toward FY 2030 and beyond.

Japan is said to be a “problem-oriented” nation, facing a variety of social challenges such as a declining birthrate and aging population, labor shortage, and energy and environmental issues. Many in the public and private sectors are working to solve these issues. Yet, said issues are so complex and multilayered, that finding solutions is no small feat. There is a limit to what one company, one organization can do. However, if we combine the wisdom and technology of Japan as a whole, we should be able to find the key to break through. We at AIST are ready to play a central role in the innovation ecosystem by uniting the wisdom of industry, academia, and government.

Opening a new door in the culture of self-reliance among Japanese companies—that is one of the key roles expected of the national innovation ecosystem. By serving as its core component, AIST hopes to aid Japan in its eventually becoming known as an “advanced problem-solving nation” and once again raise its industrial competitiveness to the top level.

National innovation ecosystem with AIST Group at its core



- Seamless and rapid social implementation
- Creating the next seeds by returning the profits of companies

Promoting organizational reform and development of advanced facilities to become an engine for innovation co-creation

AIST has undertaken two major organizational reforms in the fifth term. The first is governance reform. What I would like to emphasize here is the creation of a management structure that facilitates the execution of comprehensive strength through research department supervision. AIST has seven research departments, and there was a tendency for each department to act independently of one another. However, there are now many problems that cannot be solved by one department alone. Therefore, in order to create synergy across all seven departments, we established a Chief Technology Officer (CTO)*3 who oversees the entire organization, and a Research Strategy Planning Department*3 that, under the direction of the CTO, formulates research strategies for AIST as a whole. By creating a structure that facilitates the integration of research departments, we have strengthened our ability to

*1 Engagement ▶P37 *2 Vision of AIST▶P04
*3 Talk between Chief Technology Officer and Chief Marketing and Business Officer▶P10 / Organizational and Management Structure▶P57
*4 Management Policy for the 5th Fiscal Year▶P62

respond to complex social issues.

The second is the establishment of AISol in April 2023. AISol will work on social implementation of research results from the same perspective and at the same speed as companies. It will work alongside companies, and serve as an engine for innovation co-creation that will change said companies' business portfolios.

As a result of creating a structure to integrate research departments, and collaboration with companies being strengthened, the private funding acquired in FY 2023 exceeded 12 billion yen. The AIST Group, under which AIST and AISol become one, is preparing to further expand its scale in FY 2030 and beyond.

One such initiative is the "100 company visits" which I myself have been conducting on an ongoing basis. With the goal of visiting 100 companies that have unique strengths, I hold top-level meetings with the presidents and propose scenarios for co-creation with AIST. More than 85 companies have been visited thus far, and an increasing number of cases have progressed to the collaboration phase with a view to social implementation.

Throughout my career, I have witnessed many examples of excellent technologies and ideas that have been buried. Yet, every time I have the opportunity to meet with top executives, I am reminded of the underlying strength of Japanese companies. At times I feel that, if only we had some sort of "leverage," we might be able to move the world by fully utilizing the technological strengths of these companies. Open innovation is precisely what I consider to be the equivalent of leverage.

One of the major supporting pillars of our ambitious goals is the creation of cutting-edge facilities and environments. We established the Global Research and Development Center for Business by Quantum-AI Technology (G-QuAT)*5 in July 2023, and the Semiconductor Frontier Research Center (SFRC) in October of the same year. Open to the public, these research centers will serve as a platform for open innovation. In addition, two Bridge Innovation Laboratories (BIL), namely, the "Kanazawa Institute of Technology-AIST Advanced Composite Materials BIL," and the "Nagaoka AIST Biological Resource Circulation BIL," were established in July and November, respectively. BILs work with local universities and other organizations to develop and implement technologies based on the needs of local companies. We are also eagerly engaging in open innovation to revitalize the local economy.

AIST's core competence is human resources. We take on the challenge of creating an environment wherein a variety of career paths may be chosen

AIST's strength is its R&D capabilities, and its human resources, as the source of said capabilities is AIST's core competence. Needless to say, recruiting and training human resources are important. With young people becoming less interested in pursuing a career as researchers, competition for human resources among companies, universities, and research institutes continues to intensify. We consider recruitment to be an up-front investment, and have been taking proactive measures.

While expanding our recruitment of master's degree research positions from FY 2023, we at AIST launched a new training program for researchers with master's degrees from FY 2024. In it, obtaining a doctoral degree is designated as a work assignment at AIST, with tuition and other expenses to be covered by AIST. This will enable us to increase the number of doctoral researchers and broaden the scope of our recruitment. We have also been reviewing our personnel evaluation system to make it a more rewarding scheme with greater recognition for those who work hard. We intend to continue improving the system as we devise new ways of doing so.

Diversity of human resources*7 is also essential for AIST to enhance its value. The objective of both the AIST Innovation School, which cultivates researchers who take on the challenge of innovation, and the AIST Design School, which fosters "co-creative leaders," is to have their graduates play an active part in society as human resources with acquired expertise. Some of our corporate alumni are involved in establishing in-house co-creation spaces, and in operating learning spaces. On the other hand, there are graduates who join AIST having been attracted to us through their studies at either school. In this way, both schools serve as a pathway for AIST to increase the diversity of its human resources.

In recent years, the career paths of our staff have become more diverse. Some employees may change their research theme during the course of their research. If a staff member who has been dedicated to research wants to work on social implementation, they may play an active role at AISol. They may choose to move to another research institute, and should they decide to return to AIST, they are welcome to do so.

Conduct research and development as needed by society in response to a drastically changing external environment

How to deal with risks in R&D and social implementation is a serious subject for AIST. In order for a technology to be accepted by society, the risks associated with it must be properly explained, and the technology must be implemented with measures in place for dealing with the aforesaid risks.

For example, while generative AI is a subject attracting the most interest these days, at the same time, there are ethical concerns, its reliability and safety are being questioned, and the importance of AI governance is also being pointed out. AIST has long been researching AI quality management aimed at reducing such risks, and we are continuing our

efforts to implement the results in society. Since 2020, we have published, and have continually revised the "machine-learning quality management guidelines," which systematizes quality management in the design and development of AI systems. These guidelines are being used by a variety of organizations.

Facing operational risks and strengthening governance*8 to fulfill our responsibilities

Today, governance is becoming increasingly important in all organizations. It is impossible not to mention here, two incidents that occurred in the last fiscal year.

The indictment of a former employee in July 2023 on charges of violating the Unfair Competition Prevention Act was truly regrettable. Although we are taking steps to prevent a recurrence, such as strengthening our monitoring measures, the methods for the illegal removal of confidential information are becoming more sophisticated every year. We intend to bolster our staff training and strengthen our preparedness for both real life and virtual threats.

The other incident concerns a paper fraud that was publicized in March 2024. AIST conducted a thorough investigation, and published the results as well as measures to prevent a recurrence. The researchers who perpetrated the fraud must have been in a hurry to obtain results as soon as possible. AIST takes these incidents very seriously, and the entire AIST Group is working to prevent a recurrence, including further strengthening information management and thorough education on research ethics.

As the head of the AIST Group, I am determined to promote the social implementation of research results and the innovation creation. I will fulfill my responsibilities to achieve our mission of solving social problems and strengthening industrial competitiveness, by realizing a national innovation ecosystem in which AIST will play a central role.

*5 Research case G-QuAT▶P14
*6 Human resource development▶P40
*7 Diversity▶P38 / AIST Innovation School and AIST Design School▶P32
*8 Governance▶P56

Challenging for a New Japanese Innovation Model

"Create the Future, Collaborate Together." .....These words are at the core of AIST's vision of "designing the future, creating the future together with society," "building a research institute where members recognize each other and take on challenges together," and is a representation of the AIST brand. So what exactly is a brand? While there are many expressions about brands in the world, for my part, I understand a brand as being, "the ability to create unique characteristics + the passion to display said characteristics + the ability to pass them on." This is my current point of view, based on my experiences of being involved in corporate brand management for many years, and observing various global corporate brands in action. What, then, are AIST's unique characteristics?

AIST has strong assets that have been cultivated over many years, including the ability to create new value, namely, through the collective strength of its individuals and collaboration (human resources and team capability), by integrating seven diverse research fields while enhancing their sophistication (domain integration capability), and by building upon world-class basic research with the primary goal of solving social and individual issues (social implementation capability). AIST's unique characteristic is the "power of process" to flexibly and freely integrate these strengths and link them to the results of research and development and their implementation in society. In addition, it is the passion of the staff, including researchers, to maximize these strengths, and the organizational management to further evolve and deepen these strengths.

In terms of social implementation capability in particular, in the last fiscal year, we established a subsidiary company called AIST Solutions Co. (AISol), and shifted to a structure that promotes industry–academia–government collaboration. We aim to solve social issues and strengthen industrial competitiveness, not only by providing intellectual property licenses, research and engineering facilities, measurement, analysis and diagnostic technologies, and other expertise, but also by quickly creating new value through industry–academia–government collaboration and open innovation. The team strength of AISol's over 200 marketing personnel is one of our unique endeavors. The "100 company visits" by AIST President Ishimura and AISol President Osaka, which are conducted as a prerequisite for this initiative, are an attempt to realize a robust research program by directly proposing co-creation with AIST to many company leaders.

Today, as we look at Japan's economic growth process, we see that, following the period of growth that was advocated as "Japan as No. 1" (1979), the "lost 30 years" has continued, and industrial competitiveness on the global market stage is declining. In addition, constraints due to global environmental problems, increasingly complex social issues, and diversifying individual values, as well as geopolitics and fragmentation risks have become apparent. Under conditions that make it difficult to predict the future, solutions are being sought for an era in which there are no solutions. This is, indeed, a critical time to challenge for a Japanese-style industrial revitalization model that will continue into the future. We invite you to expand your image of AIST as it seeks to challenge for a new Japanese-style innovation model, and to create a future society.

Vice-President (part-time)
Advisor, Yamaha Motor Co. Ltd.
YANAGI Hiroyuki

AIST VISION

Create the Future, Collaborate Together

Designing and co-creating the future with society.
Encouraging mutual respect and endeavors.

Charter of Environment and Safety

1 We strive to promote research activities that contribute to the global environmental protection and the security of mankind and pursue our work to realize a safe and reliable society of high quality of life harmonious with the environment.

2 In compliance with the applicable laws and regulations related to environmental protection, we establish the autonomous standards of the institute such as Safety Guidelines, etc. and with this in mind, we shall endeavor to conserve environment and promote health and safety at all times.

3 We promote the dissemination of information related to the environmental protection and make every effort to be in harmony with and coexist with the local community. Naturally, in case of disasters or emergencies, we take prompt and proper measures to deal with the situation. Furthermore, in conformity with the 'principles of disclosure,' we shall endeavor to return the knowledge acquired and accumulated to society.

Editorial Policy

AIST publishes the "AIST Report" every year to promote understanding of AIST's activities among various stakeholders and to build a deeper relationship of trust between society and AIST.

AIST Report 2024 aims to be an integrated report that comprehensively conveys the entire picture of AIST's activities, going beyond the scope of a conventional sustainability report, in order to further enhance the transparency and credibility of AIST's activities and to provide a deeper understanding of the sustainability and value-creation processes. This report focuses on AIST's mid- to long-term value creation process, and reports on AIST's strategy and efforts to become the "core of the national innovation ecosystem" to achieve its mission of "solving social issues and enhancing industrial competitiveness." The report is designed to convey that the AIST Group, along with AISol established in April 2024, is united in its efforts to create value through the entire process from research and development to social implementation. We have expanded information disclosure more than ever, emphasizing the high feasibility of AIST's stated strategies.

The data on the environmental report for each research base is available on our website.

[**Official website of AIST**]**www.aist.go.jp**/

●Scope of reporting
Activities at all AIST research bases

●Reporting period
April 2023–March 2024

●Rounding of numbers
Rounded to the nearest displayed digit

●Reporting areas
Organizational governance, human rights, labor practices, fair operating practices, coexistence with society, environmental activities, occupational health and safety activities, and open innovation activities at AIST

●Guidelines, etc., used as reference
- "International Integrated Reporting Framework", International Integrated Reporting Council (IIRC)
- "Guidance for Integrated Corporate Disclosure and Company-Investor Dialogue for Collaborative Value Co-Creation 2.0 (Guidance for Collaborative Value Creation 2.0) "- Collaborative Creation of Value-Creation Scenarios to Achieve Sustainability Transformation (SX) - Ministry of Economy, Trade and Industry
- "Environmental Reporting Guidelines (2018 Edition)", Ministry of the Environment, Japan
- "Act on the Promotion of Business Activities with Environmental Consideration by Specified Corporations, etc, by Facilitating Access to Environmental Information, and Other Measures"
- Guidance for Environmental Reporting (3rd Edition), Ministry of the Environment, Japan
- "Japanese Translation of ISO 26000: 2010 Guidance on Social Responsibility", Japanese Standards Association (ed.)
- "GRI Standard", Global Reporting Initiative
- Report of the Study Group on Dialogue Contributing to Long-Term Management and Long-Term Investment for Sustainable Corporate Value Creation (SX Study Group) (Ito Report 3.0), Ministry of Economy, Trade and Industry

●Next issue
September 2025

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AIST Group Initiatives for Value Creation

~Toward the Establishment of a National Innovation Ecosystem~

AIST Vision: "Create the Future, Collaborate Together." (▶P04)

Fifth Term Management Policy (▶P62)

Input

- **Financial capital** (▶P64)
- **Human capital** (▶P36)
- **Research infrastructure** (development of research centers and infrastructure) (▶P29)
- **Intellectual capital** (▶P08)
- **Social capital** (▶P24)
- **Environmental consideration** (▶P48)

Business Activities

Co-creation with diverse stakeholders including companies, governments, universities, and research institutions

R & D

Development of advanced technologies in line with national growth strategies
- AI
- Quantum
- Semiconductor
- Material DX

Research and development backcasting from social issues
- Responses to energy and environmental constraints
- Measures for declining birthrate and aging population
- Contribution to a resilient country and disaster prevention
- Measures for epidemic control and infectious diseases

Research and development to enhance industrial competitiveness
- Strengthen core technologies
- Basic fundamental research
- Intellectual infrastructure development

Research DX

Research areas covering diverse industrial fields
- Department of Energy and Environment
- Department of Electronics and Manufacturing
- Department of Life Science and Biotechnology
- Geological Survey of Japan
- Department of Information Technology and Human Factors
- National Metrology Institute of Japan
- Department of Materials and Chemistry
- Global Research and Development Center for Business by Quantum-AI Technology

Initiatives to promote research and development
- National strategies/national projects
- Integrated fields project
- Young scientists' integrated challenging research
- Problem-solving integrated challenging research
- Core technology development support project

Technical intelligence

Promoting "R&D" and "social implementation" as two wheels of a cart.

Promotion of Social Implementation

Efforts to improve intellectual infrastructure, etc.
- Geological information development
- Development of measurement standards
- Standardization activities

Collaboration with local communities, small and medium enterprises, and universities
- Regional innovation promotion project
- AIST and AIST consortium activities
- University collaboration (OIL/BIL)

Strengthening international collaboration
- Signing of comprehensive and individual MOUs
- Establishment of an international network of research personnel

Promotion of corporate collaboration and business co-creation through AISol

Service	Solution area
【Technological assets】 ● Technical consulting ● Intellectual property and technology transfer 【Collaborative research】 ● PoC and MVP development ● Provision of advanced research facilities 【Business co-creation】 ● Creation of startups ● Value chain development	● Material DX ● AI/Semiconductors ● Energy Solutions ● Circular Economy ● Digital Platform ● Biotech/Well-being **Promote large-scale cooperation with companies** ● Cooperative Research Laboratory

Output

Creation of research results that lead to social implementation
- Paper presentation
- Patent applications and registrations

Promotion of social implementation through co-creation with companies
- Large-scale joint research with companies and joint research with small and medium-sized companies (including technical consulting) for PoC development and demonstration
- Licensing of AIST research results (intellectual property)
- Creation of startups

Strengthening innovation infrastructure
- Provide intellectual infrastructure
- Realization of appropriate international rules, such as international standardization
- Providing a venue for open innovation through a cutting-edge technology platform
- Support and technical consultation through public research organizations
- Human resource development

Outcome

Creation of new value

- Many new products and services are born and spread from companies collaborating with AIST.
- Creation and expansion of new businesses through startups
  - ▶Create and expand new markets, capture overseas markets, and revitalize local industries
- Maintain and improve the technical capabilities of domestic companies
- Strengthening the human resources of domestic companies
- Expanding the enhancement and utilization of intellectual infrastructure to support economic activities and innovation
  - ▶Improve quality and reliability and promote new innovations by enhancing measurement infrastructure, etc.
  - ▶Facilitate acquisition of overseas markets
  - ▶Strengthening of national and local government efforts for disaster prevention and mitigation

Solving Social Issues

Strengthening Industrial Competitiveness

Improvement of the external environment

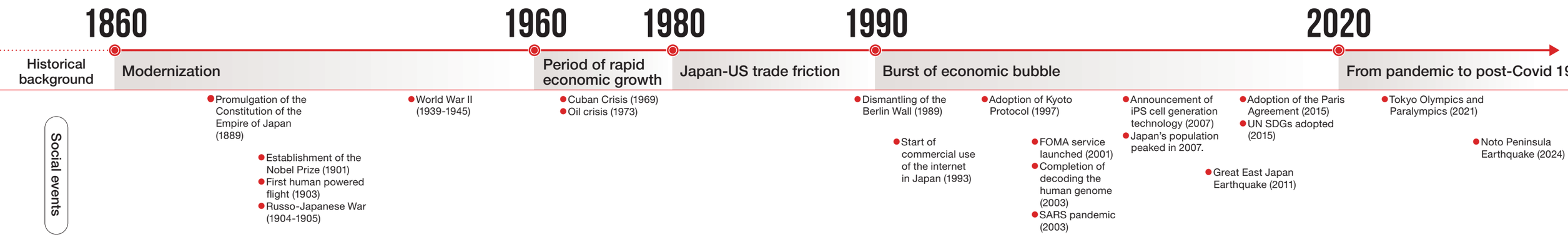
Return to and enhancement of capital

External environment surrounding AIST Group

- Various social issues (energy and environmental constraints, declining birthrate and aging population, disaster prevention, countermeasures against emerging and reemerging infectious diseases, etc.)
- Rise of emerging technologies such as generative AI and quantum computing
- Decline in Japan's relative position (industrial competitiveness and research capabilities)
- Decrease in the superiority and indispensability of key technologies in an increasingly severe and complex international situation

HISTORY OF AIST

Since the modernization of Japan, AIST has constantly responded to the changing society and produced research results required by each era and society.
In order to realize our mission, "to solve social issues and strengthen industrial competitiveness," we are flexibly changing the form of our organization. In 2023, we established AISol, and by crossing science and technology with marketing, we will more strongly promote the creation of research results and their social implementation—we have done so and we will do so in the future. The AIST Group will continue to provide indispensable value to society.



Main research results

1889~
Geological Map of Japan

1965
Glucose isomerase

1920~1930
Ammonia synthesis method

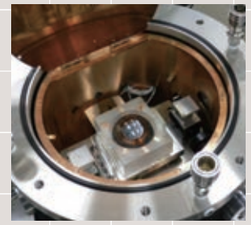
1890~
Maintenance and management of international prototype of Japan

1916
Squalene

1957
- **PAN-based carbon fiber**
- **ETL Mark- IV**

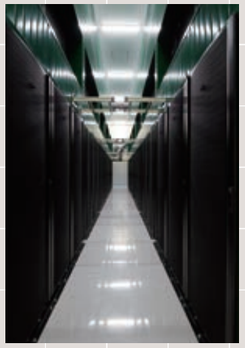
1990
Alloys for nickel-metal hydride battery anodes

2010
Planck's constant measurement that led to the revised definition of the kilogram



2004
TMR element for magnetic heads

2010
IDEA



2018
ABCI

2021
first in Japan Quantum annealing machine

R&D and Social Implementation to Create the Future

～AIST and AISol's Challenge toward Solving Social Issues and Strengthening Industrial Competitiveness～

It has been one year since the AIST Group, consisting of AIST and AISol, began full-scale operations. During this period, social implementation of research results has accelerated, leading to the emergence of new projects one after another.
In this talk, AIST Vice-President Murayama Norimitsu (Chief Technology Officer) and AISol President Osaka Seiji (Chief Marketing and Business Officer, AIST), two powerful leaders in solving social issues and strengthening industrial competitiveness, discussed what would change and strengths could emerge through the collaboration.

AISol was born out of a desire to revive the Japanese economy.

Murayama: It is a pleasure to be discussing with you today. First of all, I would like to start by talking about the prehistory that led to the establishment of AISol. It all started in fiscal year 2021, when President Ishimura said, "We should formulate a management policy to more strongly promote social implementation." At almost the same time, the Council of the Ministry of Economy, Trade and Industry was also discussing how to strengthen AIST's functions. At the end of FY 2021, AIST decided to establish a corporation for supporting the utilization of research results (later, AISol), and the Council also proposed the same. In FY 2022, an internal working group developed a blueprint, and President Osaka, as AIST's councilor, visited almost all research sites from Hokkaido to Kyushu. After extensive discussions, the project was officially launched on April 1, 2023. As for me, I believe that the greatest value of AISol lies in its ability to conceptualize and create businesses.

Osaka: In my previous job, I was involved in both business portfolio transformation and the launch of new businesses. From that experience, I knew that in order to maximize the potential of a technology, it is necessary to address not only the technology itself, but also marketing, so I was very motivated when I heard about AISol. And what I noticed when I actually tried it was the high level of technology at AIST. I have been working with President Ishimura on top sales, and the response from companies is amazing. They highly value our technology. I felt that the AIST staff may not have realized the high potential of our technology, and that AIST's ability to solve problems based on our multidisciplinary research and development had not been fully conveyed to the companies.

Murayama: President Ishimura believes that AIST's mission is to revive the Japanese economy. Japan that once ranked first in the world in GDP per capita has dropped to 38th place. There is a strong desire to revive it.

Osaka: It is often said that we have "lost 30 years," but Japan has not lost its technological capability itself. I would like researchers at AIST to polish their technologies with confidence. AISol is responsible for the part of returning AIST's technology to social value, and we will work toward the needs of society and companies based on a deep understanding of AIST's strong technologies.

Murayama: The key point here is how to properly and objectively evaluate our technologies. We are currently working to identify AIST's core technologies and focus resources on those with competitive advantages. At the same time, regarding our approach to addressing social issues, we are making concerted effort focusing on four key areas: "addressing energy and environmental constraints," "addressing the declining birthrate and aging population," "contributing to a resilient country and disaster prevention," and "measures for epidemic control and infectious diseases." Our major challenge for the future is how to link the technologies developed in these areas to AISol's business concept.

What has changed and what have we seen in the past year?

Murayama: A major change in the past year since AISol was established is that the career paths of our personnel have become more diverse. Many staff members have been transferred from AIST to AISol, and there are many examples of them thriving at

AISol by doing work that they could not accomplish within AIST.

Osaka: As you say, I believe that the form of work will develop. For example, as we conduct joint research, we will achieve results that exceed expectations, a number of large joint research projects will emerge that will have an impact on corporate portfolios, and new ventures will be born. ..... At such times, one will experience a different kind of joy in one's work.

Murayama: In terms of creating businesses, the first example is OpenSUSI, an open semiconductor design business. In addition, the operation of ABCI, AIST's AI-focused computing infrastructure, has been transferred to AISol, making it more accessible and user-friendly for companies. We expect this to accelerate social implementation and strengthen industrial competitiveness. Also, startups are making great progress under Mr. Osaka's leadership.

Osaka: While the technological elements in the 12 due diligence items (detailed investigation process) set for AISol startup certification are important, I believe that business elements such as marketing and management systems are equally critical. In the future, my ideal is that AIST's "technology scientists" and AISol's "marketing scientists" will team up to create a new business that has never existed before.

Linking AIST's cutting-edge technologies to solving social issues and strengthening industrial competitiveness

Osaka: AIST is a national research institute, and companies see an opportunity to get involved in the national growth strategy through AIST's activities, don't they?

Murayama: In line with the national growth strategy, we are working on advanced technologies including quantum, AI, semiconductors, material DX, and biotech manufacturing to strengthen industrial competitiveness. In particular, when the new center combining quantum and AI technologies is completed, it will become a facility with the world's best capabilities, attracting people from all over the world. We are already building relationships with global companies, and AISol will take the lead in negotiations when conducting large-scale joint research in the future. AISol is also planning how to manage AIST's platform for materials DX. In addition, AISol's role will become increasingly important as we plan to work with global companies in the field of semiconductors.

Osaka: Recently, a European national organization and an economic mission visited us, focusing on those AIST technologies. The world seems to be saying, "We need to collaborate more with Japan and reassess the potential of Japan's technological capabilities." Meanwhile, within Japan, the mindset of business executives and CTOs is undergoing significant change. Stakeholders are no longer satisfied with merely generating short-term profits; instead, they demand strategies for the next decade and contributions to solving social issues. To solve increasingly complex social issues and drive corporate development, it is crucial to move beyond an in-house approach. Open innovation, which combines diverse insights, is essential for quickly addressing social issues.

Murayama: Just as you say, AIST established AISol not to make a profit from AISol, but to contribute to solving social issues. When creating a business together with AISol, the most important criteria for making decisions are "How it contributes to solving social issues?", and "How it strengthens industrial competitiveness?"

Perspectives on Research Management and Social Implementation

Murayama: Regarding research management, before and after the establishment of AISol, I sent out two messages as the chief technology officer. The first was "be determined to fulfill social implementation." This means that, if important issues arise as a result of marketing, I would like the researchers to proactively dedicate part of their efforts to address them, but ultimately, they must follow the chief technology officer's decision, which seems to have shocked researchers. The second message was "diversity of performance evaluation and significance of paper publication toward social implementation." This means that from now on, research results will be evaluated based on various factors, including not only the number of publications but also how much they contribute to social implementation. In addition, publishing papers is not the goal of research, but the first step toward social implementation, and we should publish papers with the mindset of how to connect them to social implementation.

Osaka: In the diagram of the national innovation ecosystem, the starting points are "problem setting" and "basic research." If a research project can be said to be "research for realizing a prosperous future," then the paper holds significant value, regardless of the phase of the research.

Murayama: I always tell them that I would like each researcher to stay true to their core, while flexibly adapting to the process of backcasting from social issues and combining their individual technologies. However, since there are differences in perspectives among researchers, it is also my responsibility to shift their mindset towards keeping social implementation in mind. Continuously presenting examples like OpenSUSI and increasing the sense of fulfillment from working with AISol will be one way to change the mindset.

Osaka: OpenSUSI, which you just mentioned, is one of the examples of social implementation. To broaden the base of the semiconductor business, AIST and AISol created an open platform so that venture companies can freely design semiconductors and receive support. We are also working on a super clean room so that semiconductor fabs for research can be used more by the private sector. We also spent a year creating IDEA, a system to disseminate to industry an inventory database of environmentally hazardous substances such as CO_2. We will also expand the capacity of ABCI, which is attracting attention from around the world, to further promote its use by the private sector. AISol will also play such a role.

Becoming a World-Leading Nation in Science and Technology Once Again

Osaka: Japanese companies are now seeking growth strategies for the next 10 years. When we meet with corporate executives and CTOs, we bring together technology scientists and marketing scientists to make new proposals. Once this approach gains momentum, we will truly realize the national innovation ecosystem in both name and substance.

Murayama: The AIST Group is working on creating mechanisms for open innovation, where people with diverse backgrounds come together to generate new value. We also place importance on contributing to the regional economy, and I believe that AISol can pave the way for new developments in regional innovation.

Osaka: If there is a unique technology in the region, it will contribute to the regional economy, and possibly even to the Japanese and global economies. The strength of the technology is the key, after all.

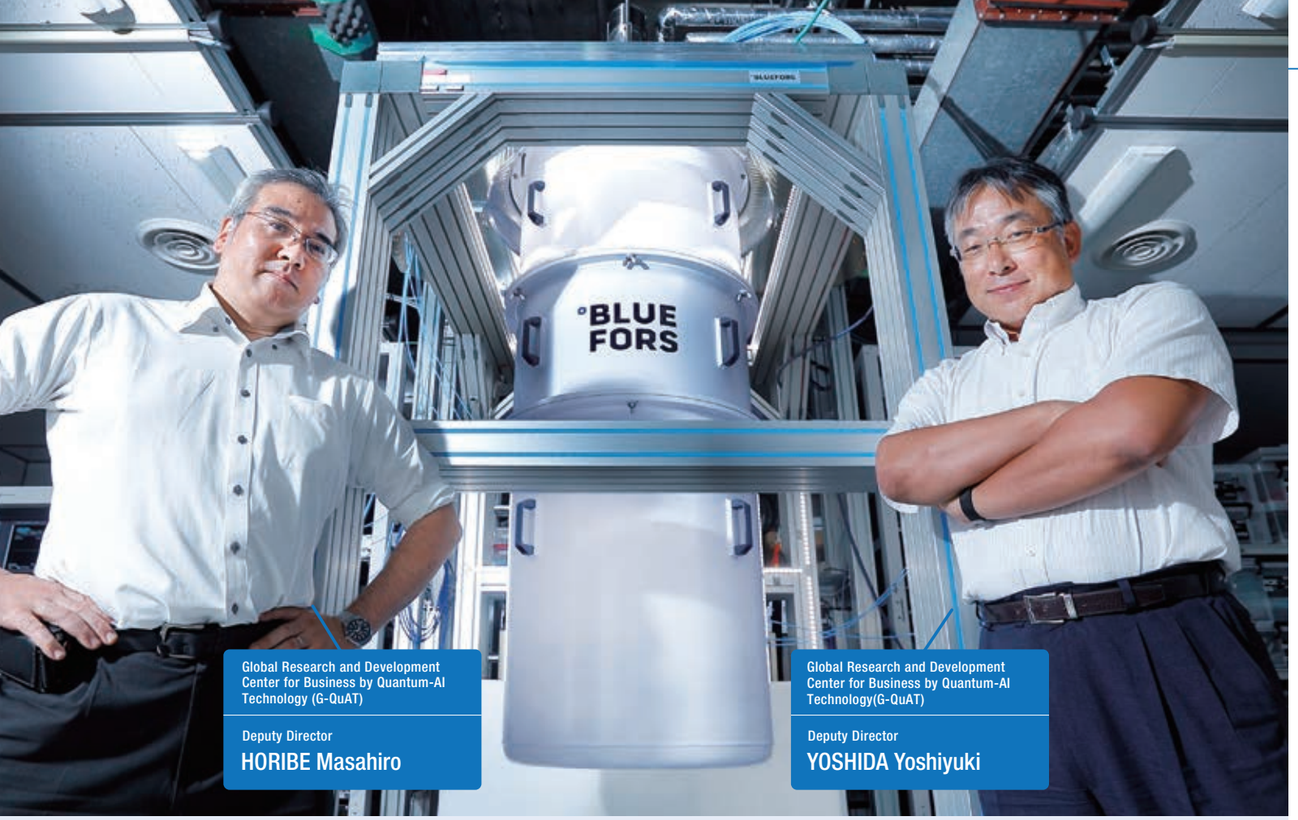
Murayama: What we want to accomplish is to revive the Japanese economy. Young employees have only experienced a Japan in decline, so perhaps it is our role to ignite a fire in their hearts.

Osaka: When we entered the workforce, it was the era of "Japan as No. 1." When the Japanese economy is growing, it offers individuals exciting career experiences. Let me tell you one more story. When I started working for AISol, I visited a national research institute. That institute was established, saying, "Aim for AIST, we want to be like AIST." And in the 1980s, when they implemented the reforms that President Ishimura and Vice-President Murayama are now aiming to achieve, the industrial policy of that country began to take off. Now, when it comes to social implementation, we are the ones learning. Since such cases certainly exist, let's start with AIST to help Japan become a science and technology nation that leads the world once again. The real challenge starts here.

Murayama: AIST and AISol have taken the first step as the AIST Group. Let us move forward with determination, overcoming various challenges and striving for growth together.

NORIMITSU
MURAYAMA
National Institute of Advanced Industrial Science and Technology (AIST)
Vice-President
(Chief Technology Officer)

SEIJI
OSAKA
AIST Solutions Co.
President and CEO
(Chief Marketing and Business Officer, AIST)



Global Research and Development Center for Business by Quantum-AI Technology (G-QuAT)

Deputy Director
HORIBE Masahiro

Global Research and Development Center for Business by Quantum-AI Technology(G-QuAT)

Deputy Director
YOSHIDA Yoshiyuki

G-QuAT, a global hub paving the way for the world's first quantum industry, is launched.

Quantum computers run on a completely different mechanism than conventional computers and far exceed the conventional processing power. It is expected to be a "dream technology" that will drastically change society. The common issue worldwide is how to utilize quantum technology in the real world. On July 27, 2023, AIST established the Global Research and Development Center for Business by Quantum-AI Technology (G-QuAT) to support industrialization and create markets.

A research center bearing the words "business development" and "global" that supports the industrialization of quantum technology in collaboration with like-minded countries

Since quantum computers have made dramatic progress and started to be available for actual use around 2020, many countries have announced their quantum strategies for industrialization from 2022 to 2023. The Japanese government has been ahead of the rest of the world in formulating strategies for the industrialization of quantum technology, such as the "Vision of Quantum Future Society[*1]" and the "Strategy of Quantum Future Industry Development[*2]." G-QuAT was established based on the analysis and recommendations of these strategies. We interviewed Horibe Masahiro about its positioning.

"G-QuAT is not only an R&D organization, but also has the mission of building a global business ecosystem. We will promote the development of applications that take advantage of Japan's strengths and the construction of supply chains for component materials, but what is important here is that the companies responsible for the business play a leading role. We are in a position to support the industrialization of quantum technology by companies through the provision of state-of-the-art facilities and environment, diverse R&D results, human resource development, and intellectual property/standardization strategies."

Another major feature of the G-QuAT's efforts to promote global collaboration is the appointment of eight world-renowned domestic and international top runners to the International Advisory Board.

In addition, AIST signed a Memorandum of Understanding (MOU) for research collaboration with Keysight Technologies and IBM in February and May of this year, respectively, and has begun to strengthen its ties.

Three platforms from usage environment of quantum computers to facilities for prototyping and evaluation of materials for the components

To support industrialization, G-QuAT is developing three platforms: the first is a quantum and AI computing platform. During this fiscal year, the supercomputer ABCI-Q (with 2020 NVIDIA GPU H100s), a neutral atom quantum computer (QuEra), and a superconducting quantum computer (Fujitsu) will be installed. A commercial optical quantum computer (OptQC) will also be launched at G-QuAT.

The second is an evaluation testbed. Quantum computers are used in a very special environment, and we provide evaluation services by preparing evaluation facilities that are close to the actual usage environment. This is a concept unique to G-QuAT, not found anywhere else in the world.

The third is device manufacturing technology for quantum chips and control circuits, which are the heart of quantum computers. AIST's Qufab (Superconducting Quantum Circuit Fabrication Facility) is scheduled to begin foundry services in October of this year so that many people can use it.

"When considering business creation, it is a heavy burden for companies and start-ups to develop basic infrastructure and locations from scratch. AIST is the only R&D organization that can provide its own facilities and location based on the Industrial Competitiveness Enhancement Act. Since it is possible to commercialize the results of joint development at AIST, we have received a great deal of interest and expectation from companies and startups in Japan and overseas," says Horibe, who has been impressed by the response to the project.

Hybrid with classical computers to accelerate use case development

When using a quantum computer as a "tool," there is still a limit to what can be done. The mainstream is to use the combination of classical computers and quantum computers. G-QuAT will be one of the first to build this hybrid environment to accelerate the development of use cases.

The more use cases there are, the wider the base of users becomes, and this is also where AIST can demonstrate its strengths. AIST's seven research areas have already established a model in which new solutions using computation are developed and implemented in society by collaborating companies. By incorporating new computational technologies such as quantum and AI into this model, we can expect the speedy creation of industrially valuable solutions and pave the way for the promotion of business use of quantum technology.

In addition, an incubation and collaboration space will be established on the second floor of the Quantum-AI Fusion Research Building, scheduled for completion next March, and opened to users, vendors, suppliers, investors, and others seeking to create businesses. The idea is to provide a place where people can connect with each other, thereby inducing collaboration among diverse stakeholders and accelerating business creation. In the process of developing this infrastructure, Yoshida Yoshiyuki says that information security is becoming increasingly important. "As quantum is positioned as important emerging technology along with semiconductors and AI, we are discussing how to protect technical information and are considering security zoning for the new research building."

The next few years are the time to move toward a society in which quantum and AI technologies are "usable."

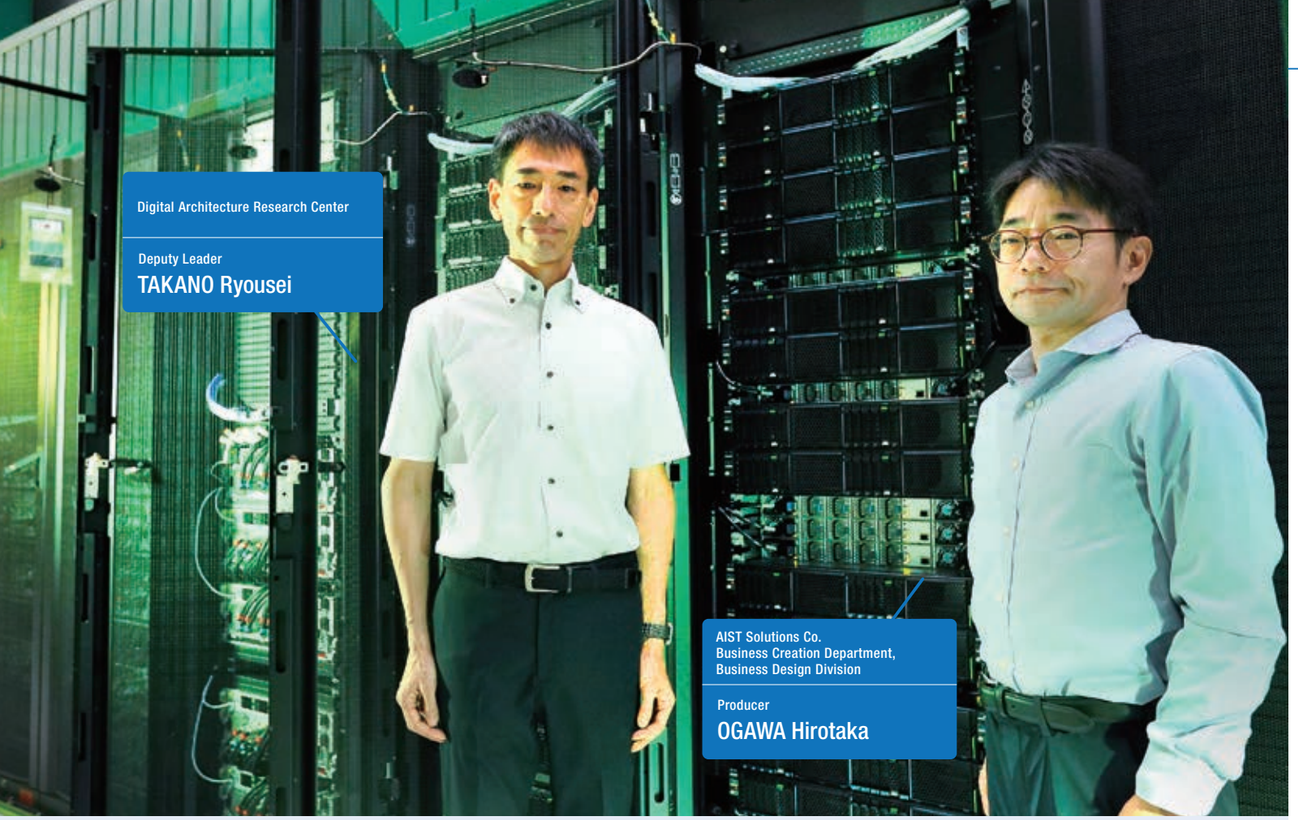
In order to win against the world in both technology and business in the field of quantum computers, Horibe sees "the next three to five years as the time of challenge."

"I hope that the use of computational infrastructure as an industrial tool will improve labor productivity in Japan and lead to economic affluence. I also hope that a world in which robots like nursing care robots and autonomous driving work along with us will be realized in the next 20 years or so through a hybrid of quantum and AI technologies."

Yoshida envisions a future in which quantum and AI technologies are implemented in society as follows: "Ultimately, I envision a society in which everyone in the world can compute without being aware that they are using a quantum computer. To begin with, people are not aware that ordinary computers use CPUs for calculation and GPUs for display, right? In the same way, the ideal society would be one in which people can say, 'Oh, your calculations are very fast,' or 'Actually, we are using quantum technology, aren't we?' "

As business creation progresses, a society in which quantum computers are used in a common manner will soon arrive. G-QuAT, with its advanced facilities and unique concepts, aims to be the world's one and only research center, and is now in full swing to show the world that Japan has a presence in the world.

*1 Decided by the Integrated Innovation Strategy Promotion Council on April 22, 2022
*2 Decided by the Integrated Innovation Strategy Promotion Council on April 14, 2023



High-performance, easy-to-use AI Bridging Cloud Infrastructure to accelerate development and social implementation of generative AI

The AI Bridging Cloud Infrastructure (ABCI), which connects AI algorithms with big data from the real world, was developed by AIST as an openly available large-scale computational infrastructure to accelerate the development and social implementation of AI technologies, and began operating in 2018. It was upgraded to ABCI 2.0 in 2021 and to ABCI 3.0 this year. It has been utilized by a wide range of users in industry, academia, and government achieving remarkable results and is driving industry creation through AI technology.

AI supercomputer with world-class compute and energy-saving performances and easy access for companies

AIST's efforts to build ABCI came at a time when a series of extremely important technologies for deep learning were being developed overseas. In Japan, on the other hand, although interest in AI was high, only about 10% of companies had adopted the technology. Therefore, we decided to provide a "place" where people can actually try out AI by building a large-scale computational infrastructure that is accessible not only to research institutes and universities, but also to companies.

The result was ABCI, which at the time was ranked fifth in the world for supercomputer speed performance. It has a half-precision arithmetic performance of 550 petaflops and is equipped with 4,352 of the latest GPUs; more GPUs mean higher power consumption and heat generation, but it is also characterized by the world's highest level of energy-saving performance. We asked Takano Ryousei about how it works.

"A typical data center requires almost as much power for cooling as the power consumed by the computers. However, in the case of ABCI, cooling can be done with less than one-tenth of the power consumed by the computers. The most important point is that the hot water cooling is done throughout the year using only cooling towers, which is called free cooling, instead of using a chiller that consumes a lot of power like an air conditioner. This is extremely efficient and energy-saving, and contributes to reducing operating costs."

Many achievements in the development of generative AI with faster, state-of-the-art GPUs

In May 2021, we upgraded the system to ABCI 2.0. Ogawa Hirotaka explains the process as follows.

"The number of users continues to increase steadily and the utilization rate has reached a very high level, so we have introduced a new system equipped with the latest, faster GPUs, which can be used in conjunction with the existing system. To begin with, the performance of generative AI improves with the number of parameters and the amount of data to be learned. As the number of parameters and data are increased, the performance suddenly increases at a certain point. That is why various developers are working hard on the development of generative AI. For such users, ABCI 2.0 allocates resources to the development of generative AI as a priority."

GPU servers and storage systems have been augmented to increase the performance of half-precision operations to 851.5 petaflops. Various results have been produced by utilizing this ABCI 2.0. Some examples are: "Building a Large-Scale Japanese Language Model with ABCI" (Preferred Networks), "Building a New Logistics Infrastructure with AI and Autonomous Driving Technology" (T2), "Finding Bones in Meat through Image Recognition, Evolution of Meat Processing Machines" (Mayekawa Manufacturing), "The New Digitalization of Fluid Properties Challenged by Video Analysis AI "DeepLiquid"" (AnyTech), etc."

World-class development environment enabled by upgrading to ABCI 3.0

With the rapid expansion of the global generative AI market, an upgrade to ABCI 3.0 is currently underway. Ogawa explains, "In 2.0, models with tens of billions of parameters can be developed, but the most advanced generative AI at the moment, such as ChatGPT (OpenAI) and Gemini (Google), use models with more than 1 trillion parameters. The haves, the Big Techs, can develop such generative AI, but the have-nots like the Japanese industry, academia, and government cannot do so. Upgrading to 3.0 will close this gap and create an environment that will enable Japanese industry, academia, and government to develop generative AI that can compete with the word."

AIST is also conducting research to connect generative AI to solutions to social issues, according to Takano. "Research is being conducted with a focus on the practical application of generative AI in areas where the real world and cyberspace merge. For example, we are working on a research project to detect anomalies on factory lines by using generative AI capturing data from the real world."

Another major challenge is how to transition to ABCI 3.0. "Our goal is to minimize the period when users cannot use ABCI, and ultimately switch from 2.0 to 3.0 without any downtime. First, we plan to expand the power supply, data center, and cooling systems, and then gradually replace them with 3.0 while operating 2.0, which will be a very difficult task."

By this, the half-precision arithmetic performance will become 6.22 exaflops, an increase of approximately 7 times. The transition is underway with the aim of starting operation in January 2025.

Transferring operations to AISol to foster a generative AI market

Operations were transferred to AISol in April of this year, and efforts have begun to further expand usage and provide more detailed services. Ogawa sees this as an opportunity to change the usage price and user group.

"Under the Ministry of Economy, Trade and Industry's "Cloud Program," a number of cloud service providers, including Sakura Internet and GMO Internet Group, have begun to develop supercomputers for AI development and offer them to users. In order not to hinder the emergence of this market, ABCI 3.0 prices will be raised to the same level as those of other service providers. As for the user group, ABCI intends to promote development for the public good by giving priority to national research institutes, universities, publicly funded contractors, subsidized projects, and startups."

Takano sees the role that AIST will play as follows: "In the future, we will focus more on research to advance and add value to computational resources. We will develop technologies such as AI safety and security, inference environments including collaboration with edge AI, and power-saving mechanisms, with a view to ABCI's role in the ecosystem of generative AI. We would like to validate these technologies with ABCI and contribute to raising the level of Japan's computational resource industry through technology transfers to companies."

Now that the computational infrastructure is growing, the challenge is the overwhelming lack of human resources who can handle a large number of GPUs. AIST will continue to lead the development and social implementation of AI in Japan, including the development of human resources capable of developing generative AI on par with the world's best.

One of the world's largest inventory databases for measuring environmental impact from a life cycle perspective

Life Cycle Assessment (LCA) is a method to "visualize" the environmental impact of products and services. To correctly assess the environmental impact of its entire supply chain, in addition to direct data related to manufacturing, a company needs background data related to processes outside its own manufacturing activities, from resource extraction to disposal and recycling. As part of efforts by AIST to contribute to the realization of a sustainable society, AIST-IDEA (National Institute of Advanced Industrial Science and Technology-Inventory Database for Environmental Analysis (IDEA)), an inventory database that provides background data for processes in the life cycle of products and services in Japan, is being developed by the IDEA lab.

IDEA covers every industry in Japan, so users can get all the data they are looking for.

In order to address global environmental issues such as climate change, companies are beginning to utilize LCA. However, to quantify the environmental impact of each stage of "production," "use," and "disposal," data must be collected for all inputs and outputs of all processes at each of these stages, for example the energy consumed to produce purchased raw materials. It is not realistic for companies to collect all of this data on their own. To provide this data, AIST developed IDEA.

IDEA Ver. 1 (3,000 data sets) was released in 2010. Since then, regular updates and enhancements have been released, and IDEA Ver. 3.4 (5,250 data sets) was released this April.

IDEA is one of the world's largest databases of its kind, and its comprehensiveness is one of its main characteristics. Tahara Kiyotaka, who serves as the head of the IDEA Lab, explains.

"Based on national statistics, IDEA covers all industries in Japan, including agriculture, industry, and services. The 5,250 data sets are organized by classification codes based on the Japan Standard Industrial Classification. For example, the medium level class "food manufacturing industry" contains the small level class "livestock food manufacturing industry," which contains the detailed level classes "dairy products," "cheese," and so on, This creates a hierarchical structure where all products always fit somewhere, so users can easily obtain the data they seek. IDEA's coverage is world class, and highly original, the variety of data is still at the level of a convenience store, not a general supermarket. We need to continue to update IDEA as more companies use it."


Members of the IDEA Lab, IDEA is the result of the combined efforts of many people

18 diverse areas of impact and transparent unit process data

We asked Tahara about IDEA's development guidelines and key points for data preparation.

"As there is a growing interest in climate change around the world, many people only think of LCA as looking at carbon dioxide (CO_2) and greenhouse gas (GHG) emissions. IDEA is special in that it covers a much wider range of issues. In total, there are 18 areas of impact that can be assessed, ranging from acidification and resource depletion to carcinogenicity of toxic chemicals."

"We also ensure transparency by disclosing as much as possible the sources and methods we use to create the input and output data of materials and energy used to make a product as well as what substances are released, which is called "unit process data." However, most companies are unwilling to share data on their manufacturing methods and the amount of each raw material used. Therefore, we rely on information from references such as energy statistics and the PRTR (Pollutant Release and Transfer Register) system to estimate unit process data. At that time, since there are various manufacturing processes for the same product, we aim for representative and average areas, and to some extent, we make data with a degree of foresight. That is where our technique and know-how come in," says Tahara.

Data updated in Ver. 3.4 to reflect international cooperation and social needs

Looking around the world, only a few countries have developed inventory databases. Global LCA Data Access of the UN (GLAD) is working on aligning the three largest databases of the world and making them mutually usable. IDEA Ver. 3.4 has been updated to reflect such international trends and social needs.

In addition, international standards and guidelines have diverse requirements. An example is the quantification of GHG emissions related to land use. IDEA has responded with a major update to enable quantification of GHG emissions, so that the effect on climate change of changes in land use, such as the clearing of forests, can be assessed. IDEA also addresses biogenic CO_2. When there is a balance between CO_2 absorbed through photosynthesis and CO_2 emissions from biomass combustion and other sources, it is easier to count both absorption and emissions as zero. However, recently there is a demand to properly count CO_2 fixed by biomass products. To do this, the amount of CO_2 absorbed by photosynthesis and fixed in the form of biomass must be expressed as a negative emission, and the CO_2 emitted when biomass products, etc. are combusted must be accounted for separately. Although IDEA does not contain all of this data yet, as a provisional measure, it provides the amount of CO_2 sequestered by photosynthesis into each biomass product so that the amount of CO_2 fixed by biomass products can be assessed.

Focusing on continuous development to become a more widely used evaluation tool

We interviewed Monna Tetsuya, about the activities of the Consortium for Promotion of LCA Application, which he manages and that promotes the use and dissemination of IDEA.

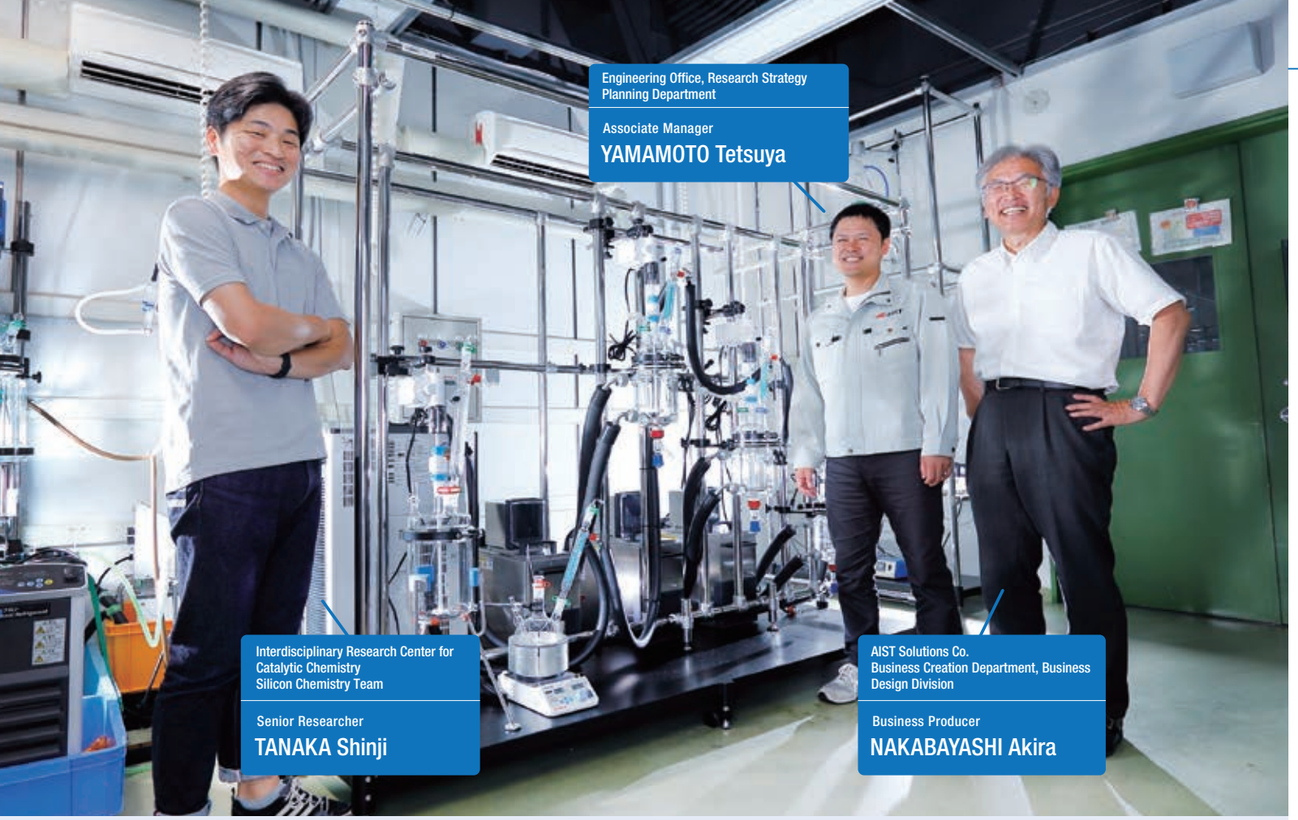
"We have a growing number of members, with about 500 members at the end of the last fiscal year. Some of them are beginners in LCA, so we provide services such as workshops, consultation sessions, and lectures to help them use IDEA properly and effectively."

From April this year, development will continue as before at AIST, but AISol will act as the sales contact. For this purpose, AISol has concluded a license agreement with the three existing sales companies. Since IDEA is intended to be a database for all industries, efforts are being made to establish a system to make it available to as many companies as possible.

Regarding future prospects, Tahara said, "The world is moving toward carbon neutrality by 2050, and it is important to see how much environmental impact has been reduced at that time. I also hope to develop a database that can be used for international cooperation, especially in Asia. Toward this end, we are conducting research to extend IDEA temporally and spatially."

Finally, we asked Monna what kind of society he would like to create through the social implementation of IDEA. "For example, by using IDEA, makers of food products will be able to show GHG emissions together with lists of ingredients, and consumers will be able to choose what they want to buy based on this information. In this way, I hope that the results of IDEA will be used as a basis for making decisions when buying various products such as cars and houses, and that we can create a society in which people can make their own decisions with consideration of the environmental impact of their daily lives."

The development of the inventory database is never ending, and AIST will continue to work on further upgrading IDEA in order to contribute to the realization of a sustainable society.



New chemical recycling technology to recycle composite material plastics

Environmental pollution caused by plastic waste is a major problem worldwide. AIST has focused on polyethylene terephthalate (PET) resin, which is very widely used in modern society as PET bottles and polyester fiber, and developed low-energy and low-cost chemical recycling technology. Now, researchers, engineering personnel, and AISol are teaming up to implement this technology in society.

Developing a technology that can decompose PET at room temperature to tackle the difficult task of recycling composite fibers

About 8.24 million tons of plastics are disposed of in Japan each year, and about 86% are recycled through chemical recycling, material recycling, and energy recovery. However, according to the EU definition, which does not include energy recovery, Japan's recycling rate is only 25%. Therefore, more chemical and material recycling is needed, and the development of basic technologies is an urgent task.

Most plastic waste is a composite material, and chemical recycling is suitable for effectively reusing it in a cyclical manner. However, the conventional method involves a reaction at a high temperature of 200°C or higher, which poses a challenge in terms of energy cost. Tanaka Shinji has developed a revolutionary technology to overcome this problem.

"The chemical depolymerization (decomposition) of PET with methanol is an ester exchange reaction in which alcohols are exchanged with each other. The problem is that it is an equilibrium reaction in which both forward (decomposition) and reverse (polymerization) reactions occur. If the reverse reaction is not suppressed, the decomposition efficiency will decrease. Therefore, we came up with an idea to accelerate the reaction by using a solvent called "dimethyl carbonate," which easily reacts with the byproduct ethylene glycol, and converting it to ethylene carbonate, which is chemically stable. With this method, PET can be depolymerized at room temperature."

In the verification process after crushing PET bottles, they finally succeeded in obtaining dimethyl terephthalate, a raw material for PET, with a recovery rate of more than 90%. When they published their paper and press release on November 8, 2021, the response from the textile industry was even greater than expected. Six months earlier, the Ministry of the Environment had released a "Sustainable Fashion" website to disseminate information on clothing and its environmental impact.

In fact, Tanaka's technology is also effective for composite fibers. "We hope to expand the technology we have developed to composite fibers and dyed fibers. Recently, we conducted experiments with composite fibers made of polyester and cotton, and polyester and polyurethane, and demonstrated that the depolymerization reaction proceeds under almost the same conditions and dimethyl terephthalate can be recovered, while cotton and polyurethane can also be recovered respectively."

To extract all components from composite fibers in a reusable form—ambitious research continues to establish this extremely difficult technology.

Scaling up for social implementation to identify issues and master the technology

Yamamoto Tetsuya, who belongs to the newly established Engineering Office in April 2023, is responsible for developing scale-up technologies for social implementation of research results.

"The project is on a tight schedule to have the commercial plant up and running by 2030. This year, we conducted a demonstration test at a bench plant that can process from 5 kg to 50 kg of feedstock, compared to a maximum of 500 g at the lab scale. We will now move on to the basic design and construction of the pilot plant and then to the demonstration test."

Various issues were found at each stage of the scale-up process, and Yamamoto is working with Tanaka to advance development.

"If unreacted fabric components remain inside the reactor, the problem is how to recover them. On the other hand, sometimes the agitation in the reactor works well and produces better results than in the lab. Until now, it was easy to react with 100% PET, but from now on, we will need to refine the technology so that it can be adapted to raw materials with mixed components such as cotton and polyurethane."

With an eye toward the formation of a circular economy ecosystem

AISol's role is to link AIST's excellent seeds to social implementation, but its goal is not limited to the practical application of technology, according to Nakabayashi Akira.

"We are trying to form a circular economy ecosystem. At the root of this is the problem of global population growth, and we must contribute with technologies and systems that consider the total balance between well-being and activities that do not exceed the planet's limits (planetary boundary).

We see the social implementation of AIST's innovative PET chemical recycling technology as one of the flagships for achieving resource recycling through technological innovation. Mr. Tanaka's technology has a very clean reaction and is very efficient. That's why it could be possible to significantly shorten the 10 years it would normally take for social implementation, and we have set 2030 as our target year."

Nakabayashi is considering recycling plastics as a whole; as a set of both of expanding existing material recycling while complementing areas that until now could only be disposed of or incinerated with Tanaka's chemical recycling.

AIST Group's unique new structure to promote both R&D and social implementation

We asked the three about their thoughts on how they perceive the system in which researchers, engineering personnel, and AISol work together to promote social implementation.

"There are many things that can be learned only by scaling up, and I am very grateful for this experience, which I would not normally have. It will be my strength when I pursue research and development on other themes in the future. Also, under this system, I can concentrate on my own basic research and think about the next technological seeds." (Tanaka)

"I feel a great sense of fulfillment because this technology has a great impact on social issues. This is the first case at AIST where this system is being implemented in society. I want to do everything I can to make this a good model case." (Yamamoto)

"I feel that working at the AIST Group enhances my perspective because we have a great group of people and a high level of technology. It is very interesting to think about how we can help society as a whole to develop." (Nakabayashi)

The three are moving forward in a team that aims for social implementation, with an eye beyond toward the realization of a sustainable circular economy.

Industry–Academia–Government Collaboration

Data of Research Activities (FY 2023)

See pages 34–35 for more details. ▶

Research presentations (in journals)	3,889 cases
Research presentations (oral)	7,949 cases
Joint research projects with companies	877 cases
Joint research revenue	338.3 million yen
Commissioned research projects from companies	77 cases
Commissioned research fund from companies	20.3 million yen
Acceptance of external researchers for joint research	1,878 people
AISol employees	152 people
Technology consulting	865 cases
Technical advice	2,675 cases
Contribution of AIST researchers to international standardization activities	560 people
AIST standard proposals	48 cases
MOUs concluded with overseas organizations	18 institutes
Foreign researchers	702 people

Data on Personnel Training and Use (FY 2023)

Cross-appointment program users	51 people
AIST Research Assistant Program users	429 people
Technical trainees accepted	1,490 cases
Students who finished courses at AIST Innovation School	46 people
Students who finished courses at AIST Design School	8 people

Social Implementation of Technology

AIST conducts joint research, commissioned research, technology consulting, technical advising, contract testing, provision of research samples and so forth, and contributes to R&D and product development by businesses. At hubs such as the Cooperative Research Laboratories and Open Innovation Laboratories, AIST collaborates with companies and universities to investigate possible applications of technology and promotes open innovation.

Provide a Platform for Industry–Academia–Government Collaboration and Promote Acceptance of Researchers

See page 35 for more details. ▶

●Active invitation of external researchers

•Acceptance of external researchers for joint research accepted in FY 2023: 1,878

AIST provides researchers from our joint research partner institutions with an access to AIST's state-of-the-art facilities to conduct effective joint research.

●A platform for industry–academia–government collaboration

AIST recruits members from, and collaborates with, various companies and organizations to organize thematic meeting structures (AIST Consortiums). We explore potential application of cutting-edge technologies and aim at promoting R&D and creating new markets.

●Joint and commissioned research projects conducted in past years

Our joint research is R&D projects between AIST and our cooperative partners—companies, universities, or public research institutions with common objectives and goals—with the aim of creating innovative results that cannot be achieved by individual research. Commissioned research is a type of R&D project conducted solely by AIST under contract with a company or other organization. Through this research, companies can use AIST's research potential to offset their lack of necessary technology to proceed with their own R&D project. Technology consulting is a system by which AIST—a multidisciplinary group of professionals—provides solutions based on its cutting-edge research capability and abundant knowledge to overcome challenges that companies cannot solve by themselves. In FY 2023, 865 cases were conducted.

Marketing Activities toward Creation of Innovation

In addition to "technology proposal type" collaboration, in which AIST proposes its technological seeds as solutions to the needs of companies, AIST is strengthening its efforts in "co-creation type consulting," in which it searches for and proposes new businesses together with companies and conducts the necessary studies based on its technology consulting system. We are also promoting marketing activities aimed at creating innovations for companies in a wide range of industries and business sizes.

In order to achieve our mission of "solving social issues and strengthening industrial competitiveness," and to strengthen the system and activities for social implementation of research results, AIST established AISol, a 100% AIST-invested corporation in April 2023, in accordance with the "Act on the Revitalization of Science and Technology Innovation," as a supporting corporation for application of results.

Based on the technologies that AIST has cultivated over the years, AISol promotes collaboration with companies in six different solution areas: Energy Solutions, AI & Semiconductors, Circular Economy, Material DX, Bio-Wellbeing, and Digital Platforms. Specifically, we provide the high business value demanded by companies and society by providing technology assets, coordinating joint research, implementing demonstration projects for social implementation, building value chains, and creating startups.

AIST, with an eye on future social issues, conducts a wide range of research from basic research to applied research and even empirical research. It is building an ecosystem in which the results are linked to social implementation and innovation at the optimum time through joint research with companies and other means. AISol will participate in this ecosystem and actively work to create higher business value.

Cooperative Research Laboratory

In order to conduct R&D that more closely relates to the strategies of companies, we are collaborating with partner companies and have set up Cooperative Research Laboratories in AIST bearing the names of these partner companies. The partner companies provide researchers and research funding, and AIST provides research resources including researchers, research facilities and intellectual property. The researchers loaned from the companies and AIST's researchers work on R&D in cooperation. As of March 2024, we were operating 20 Cooperative Research Laboratories. We hope they continue to make an impression as platforms for collaboration and synergy involving companies, universities and other research institutes.

In FY2023, "TOHO HOLDINGS–AIST Universal Medical Access Cooperative Research Laboratory" and "Konica Minolta–AIST Bioprocess Technology Cooperative Research Laboratory" were established.

OIL (Open Innovation Laboratory)

AIST has set up Open Innovation Laboratories ("OILs"), which are industry–academia–government collaborative research bases sited on university campuses. As of April 2024, 7 OILs were in operation. The co-operation of research bases with universities makes it possible to seamlessly conduct basic research, application research, development, and testing. As part of this collaboration, we also utilize our Cross-appointment Program to accelerate research through mobility of human resources as well as the Research Assistant Program to train doctoral candidates by practical approaches. Through these efforts, we integrate the university's basic research with AIST's goal-oriented basic and applied research, and will promote social implementation of technology to solve social issues.

In FY 2023, we strengthened our social implementation function in collaboration with universities, local governments, and businesses by developing opportunities for co-creation.

Participation in Technology Research Associations

A technology research association (hereafter referred to as "association") is a mutual assistance organization in which companies, universities, and national research institutes cooperate to conduct experimental research on technologies used in industrial activities by providing researchers, research funds, and equipment, and jointly manage the results and utilize them among the association members. AIST participates as a member and contributes to the activities of the association from planning to research implementation and utilization of the results.

Particularly by sharing our "personnel" and "premises" with the associations, we aim to serve as a field where various people from different organizations can share their knowledge toward co-creation. We thus aim to help promote open innovation.

Specifically, AIST "people" participate in the association as researchers, project leaders, and officers. AIST also provides its facilities and equipment as a "place" for conducting research to researchers from industry and universities who participate in the association.

●Technology Research Associations in which AIST participated (FY 2023)

	Name		
1	Photovoltaic Power Generation Technology Research Association (PVTEC)	8	International Research Institute for Nuclear Decommissioning (IRID)
2	Lithium Ion Battery Technology and Evaluation Center (LIBTEC)	9	Decarbonized Industrial Thermo-System Center (DITS)
3	Fuel Cell Cutting-Edge Research Center Technology Research Association (FC-Cubic)	10	NMEMS Technology Research Organization (NMEMS)
4	The Research Association of Automotive Internal Combustion Engines (AICE)	11	Technology Research Association for Future Additive Manufacturing (TRAFAM)
5	Technology Research Association for Next Generation Natural Products Chemistry	12	Leading-edge Semiconductor Technology Center (LSTC)
6	Manufacturing Technology Association of Biologics (MAB)	13	Geological Carbon Dioxide Storage Technology Research Association (CCS)
7	Control System Security Center (CSSC)		

Promotion of International Standardization

See page 34 for more details. ▶

Standardization themes that crossover a number of industries are increasing such as for various connected products with the advancement of digital technology. Under such circumstances, Intellectual Property and Standardization Promotion Division and research domains coming together, is further promoting cross sectoral standardization activities that span over industry and research based on political and industrial needs.

At international organizations such as International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC), 73 AIST researchers are actively serving as chairs, committee managers, or convenors while 487 in total are contributing as experts to the development of standards based on their expertise.

In FY 2023, ISO/TR 5469 (Artificial Intelligence), the foundation for "safety and security" in AI industrial applications, was issued, and a total of 48 domestic and international standards were proposed by AIST, including promoting international standard development and rule formation in cooperation with NIST of the United States and relevant European organizations.

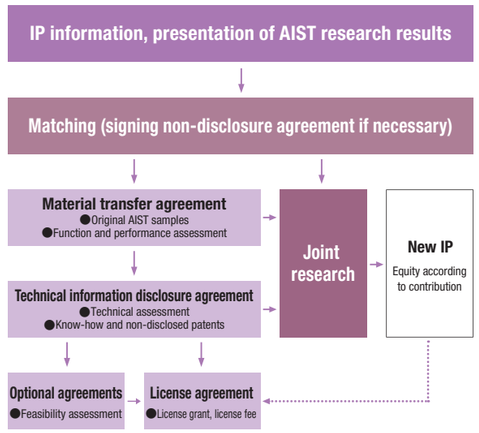
AIST's Standardization Officers (SOs), who provide support for standardization promotion, have been recognized for their ongoing standardization efforts, and five support members including SOs received the "2023 Industrial Standardization Awards" (including awards from the Director-General of the Industrial Science and Technology Policy and Environment Policy Bureau). AIST's priority issues include, for example, standardization of GX technologies and smart cities, and support for the development of standardization strategies for the realization of a circular economy-based society, which is one of the challenges facing society.

Technology Transfer Activities

One of the main missions of the AIST Group is to contribute to the development of the economy and industry by disseminating its research achievements to society. To achieve this mission, the AIST Group develops a strategic approach to obtain intellectual property (IP) rights, and appropriately maintain and manage such IP rights, and strongly promotes technology transfer with intellectual property at the core led by AISol which was established in April 2023.

Specifically, based on the needs of the partner in cooperation for AIST Group's intellectual property, we perform the necessary procedures (signing a non-disclosure agreement, a material transfer agreement, a technical information disclosure agreement, a license agreement and such), and promote wide dissemination of AIST's research outcomes in society.

●Technology transfer process



Strengthening International Collaboration

AIST is building a global network with prominent research institutes around the world and is promoting efficient and effective research cooperation through international collaborative research, workshops and seminars, and personnel exchanges which include dispatching and inviting researchers.

Increasing Global Presence

AIST has been raising its international profile not only by conducting world-leading research but also by strengthening collaboration with overseas research institutes and through inter-organizational personnel exchanges. As an effort to enhance collaborative relations with overseas institutes, AIST, together with RIKEN, organized the Twelfth Global Summit of Research Institute Leaders in October 2023. The purpose of this summit was to bring together the heads of the world's leading research institutes to discuss the future of science and technology, the role of each institute, and collaboration among research institutes.

The heads of 25 research institutions and other organizations from countries and regions around the world participated in the conference, and AIST President Ishimura attended. In response to this year's theme “Challenges facing research institutions from potentially disruptive technologies, in particular generative AI,” in his opening remarks, President Ishimura noted the need to recognize and deepen understanding of both the positive and negative impacts of generative AI and other innovative technologies on research activities. After presentations by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) of Australia and AIST, there was a lively exchange of views on the status of generative AI and other technologies in each country and the efforts of each research organization.

Accepting Foreign Researchers

See page 35 for more details. ▶

To enhance cooperation with overseas research institutes and to develop an international network of researchers, AIST welcomes foreign researchers from universities and research institutes around the world. In FY 2023, a total of 702 foreign researchers engaged in research at AIST.

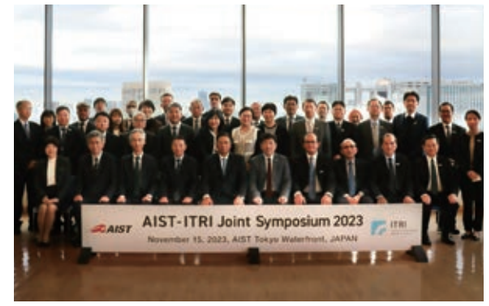
Strengthening International Collaboration to Solve Global Issues

AIST has concluded Memoranda of Understanding (MOUs) on comprehensive research collaboration with 18 leading institutes representing various countries/regions worldwide and is engaged in the development of international research networks. In accordance with these MOUs, we aim to tackle global issues through joint research and personnel exchanges with overseas research institutes.

At the same time, through international collaborative research, workshops and seminars, and international conferences, AIST is forming a global network with influential research institutes in countries around the world and is promoting efficient and effective research cooperation. In November 2023, a joint symposium with the Industrial Technology Research Institute (ITRI) of Taiwan, “AIST–ITRI Joint Symposium 2023” was held at the AIST Tokyo Waterfront. Approximately 60 people attended the symposium, including AIST President Ishimura, Vice-President Tsuneto, Executive Officer Usuda, and others from AIST; President Osaka from AISol; President Liu, Vice President Hu, CMO Lin, and Representative Yang from ITRI; and researchers from both organizations.

In his opening remarks, President Ishimura congratulated ITRI on its 50th anniversary this year and expressed his pleasure at being able to hold a joint symposium face-to-face for the first time in four years. He also mentioned that AIST established AISol in April this year, and expressed his hope for closer collaboration between ITRI and AIST in terms of social implementation. After keynote speeches by Executive Director Usuda, Deputy Director Man of ITRI's Green Energy and Environment Research Laboratories, and President Osaka of AISol, presentations on research collaboration achievements of the two institutions, and a lab tour, technical sessions were held on three themes, during which lively discussions took place.

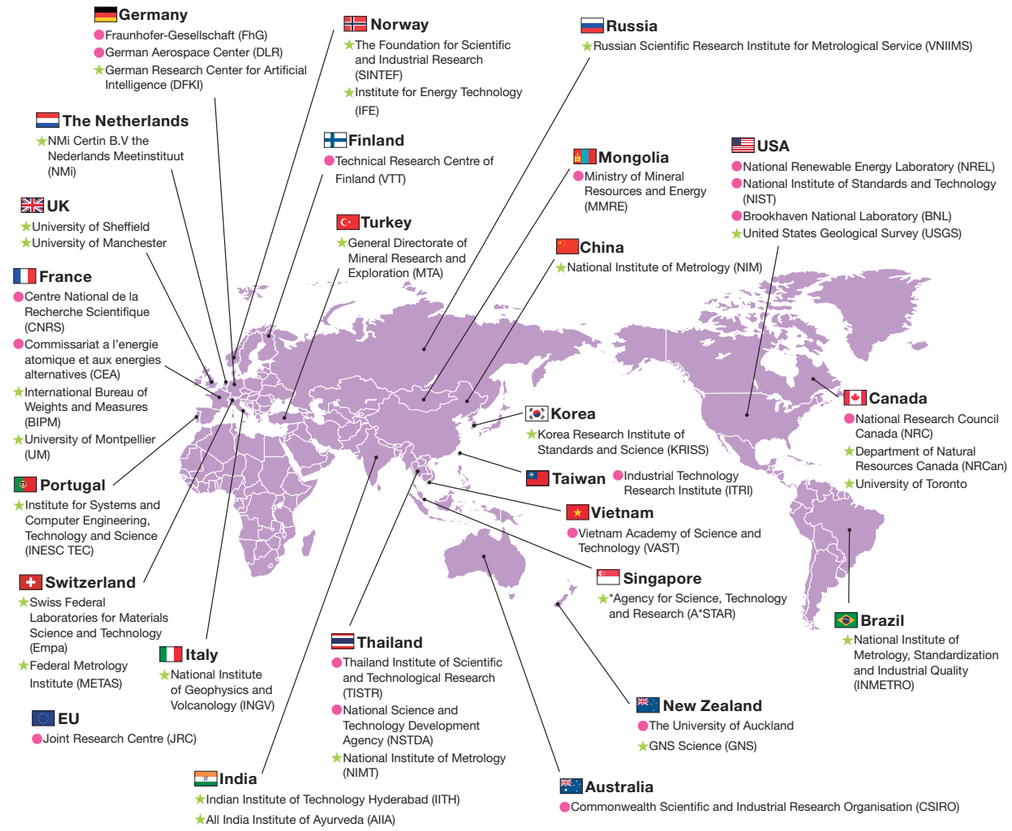
On the following day, the 16th, lab tours were held at the Fukushima Renewable Energy Institute, AIST (FREA) and AIST Tsukuba.



AIST–ITRI Joint Symposium 2023 Group Photo

List of MOUs

● : Comprehensive MOUs ★ : Specific MOUs (promotion of collaboration in specific fields. excerpts)



As of March 31, 2024

Community Involvement

Response of the Geological Survey of Japan to the 2024 Noto Peninsula Earthquake

●What was the 2024 Noto Peninsula Earthquake?

The 2024 Noto Peninsula Earthquake (hereafter referred to as the “Noto Peninsula Earthquake”) occurred at 16:10 on January 1, 2024 in the Noto region of Ishikawa Prefecture, Japan, with a magnitude of 7.6 (epicenter depth of 16 km). In Shika Town and Wajima City, the seismic intensity was 7, in Nanao City, Suzu City, Anamizu Town, and Noto Town, it was upper 6. In addition, the earthquake claimed the lives of 260 people (as of June 25, 2024), making it the deadliest earthquake since the start of the Reiwa era in 2019.

●Survey conducted before the Noto Peninsula Earthquake

The Geological Survey of Japan (GSJ), AIST, has been conducting marine geological surveys around the Japan Sea since the 1970s, initially under the Agency of Industrial Science and Technology. GSJ conducted marine geological surveys around the Noto Peninsula area from the late 1980s to the early 1990s, and has published several marine geological maps. In addition, following the magnitude 6.9 earthquake that struck the Noto Peninsula in 2007, GSJ developed a new high-resolution multichannel seismic survey system to fill in the blank area between marine geological maps and terrestrial geological maps, and used to investigate active faults in shallow waters off the northern coast of the Noto Peninsula. The results of these surveys were used by the Study Group on Large Scale Earthquakes in the Japan Sea (2014) to develop models of the largest class of tsunami faults. Furthermore, GSJ has pioneered research on earthquakes in the Noto region by conducting studies such as elucidating the history of coastal uplift associated with past earthquakes.

●Response to the Noto Peninsula Earthquake

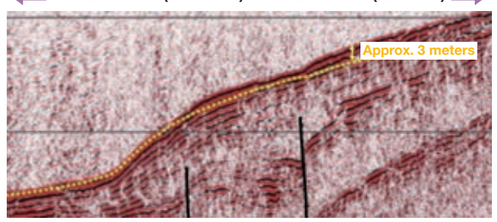
Based on the above, GSJ began responding to media inquiries on the day of the earthquake, and by January 8, one week after the earthquake, GSJ dispatched survey teams to the site and promptly published initial findings on its official website. Among the findings, the results of the survey, which confirmed a 4 m uplift at Kaiso, Monzen Town, Wajima City, were covered by many media outlets (Figure 1).

In April 2024, GSJ conducted an emergency survey on submarine active faults to determine the previously undetermined earthquake source fault (Figure 2). These results were provided to the Earthquake Research Committee of the government's Headquarters for Earthquake Research Promotion, and contributed to the evaluation of the earthquake as being caused by “the possibility that active faults offset in two new areas.”

●Future Initiatives

The Noto Peninsula has at least three coastal terraces, indicating large earthquakes, similar to the 2024 event, have periodically uplifted the coastline by several meters. However, the recurrence intervals of such large events remain unclear. Furthermore, there are still many unknowns, such as the continuity of the submarine active faults, the mechanism by which the faults moved simultaneously, and the relationship with the earthquake swarm around Suzu City since December 2020. GSJ will continue to conduct further surveys and research in the Noto region to clarify the history and mechanisms of these massive earthquakes.

(Figure 1) Coastal uplift of approximately 4 m observed at Kaiso, Monzen Town, Wajima City



(Figure 2) Seismic reflection profiles of the northern coast of the Noto Peninsula acquired in April 2024. The yellow dotted line indicates the location of the seafloor surface at the time of the 2008 survey. The survey results show that the southeastern (landward) side of the fault (solid black line) was uplifted by approximately 3 m.

Strengthening the prototyping and evaluation platform function of regional research bases

●Development of a prototyping and evaluation platform

Utilizing the Regional Innovation Creation Collaboration Center Development Project of the FY 2021 supplementary budget, etc., one new prototyping and evaluation platform (PF) was established in 2023 and four new PFs were developed, leveraging the strengths of the regional research bases (see figures below). AIST has introduced equipment and facilities to provide a set of services ranging from understanding the development needs of products and services of local SMEs, etc. to R&D, prototyping, and evaluation. AIST will contribute to the promotion of regional innovation by providing support for usage and analysis of investigation results.

●Nanomaterial Evaluation and Prototyping PF (AIST Tohoku)

To enhance the industrial competitiveness of the Tohoku region by leveraging its local nanomaterial resources (such as clay microcrystal dispersion materials and nanoscale materials like zeolites), we have installed equipment and facilities for the design, prototyping, and evaluation of nanomaterials. By integrating AIST's expertise in nanomaterial design, manufacturing, and evaluation with the capabilities of this platform, we aim to support companies engaged in developing and distributing materials for resource recycling technologies, hydrogen storage products, electric vehicle components, and more.

Nanomaterial Evaluation and Prototyping PF website:
https://unit.aist.go.jp/tohoku/nepp/.

Nanomaterial Evaluation and Prototyping PF

●Other prototyping and evaluation PFs

Hokuriku Digital Manufacturing Center

Digital manufacturing

Opened on May 21, 2023. PF conducts demonstrations related to smart textiles, metal 3D printers, and shape measurement technology, using digital manufacturing technology to solve issues related to high value-added and service-oriented textile industry, high-precision and high-efficiency processing technology, and IoT human resource development.

◀Metal 3D printer for rapid manufacturing using digital technology

AIST Hokkaido

Bioresource analysis

PF is competent for developing new functions and applications of bioresources, expanding them for applied technologies such as improvement of productivity and functionality of agricultural, forestry, and marine products, advancement of bio-production of useful substances, and treatment and effective utilization of wastewater and waste. The PF provides solutions to technical issues such as advanced analysis of genomes and genes of microbes and plants, and microflora in environmental samples such as soil and water, and primary functional evaluation of agricultural, forestry, marine and food products.

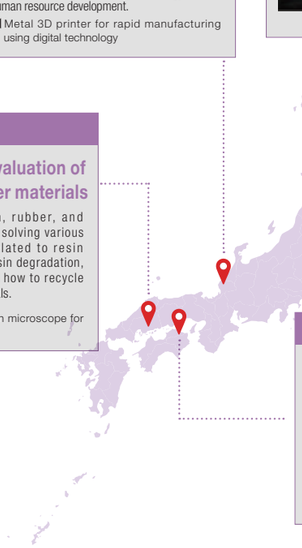
◀High-performance cluster machines for advanced utilization of industrial microorganisms

AIST Chugoku

Analysis and evaluation of resin and rubber materials

PF diagnoses resin, rubber, and bio-based materials, solving various technical issues related to resin materials, such as resin degradation, product defects, and how to recycle resins and other materials.

◀Transmission electron microscope for observation of resins



AIST Tohoku

Prototyping and evaluation of nanomaterials

AIST Shikoku

Digital healthcare analysis

PF can evaluate and analyze everything from substances to biological functions and behaviors such as gait, in order to solve the social issues of declining birthrate and aging society. It solves technical issues such as exploring the functionality of various materials, evaluating biological effects, and measuring and analyzing physical movements.

Virtual Reality (VR) Integrated Treadmill Walking System▶

Deploying and developing human resources

AIST promotes staff exchanges to facilitate the development and utilization of personnel who will produce innovation. AIST's efforts to develop training activities include AIST Innovation School and AIST Design School.

Cross-appointment Program

See page 34 for more details. ▶

To create a cross-institutional research system, in November 2014 AIST established a cross-appointment program. This program allows a researcher to enter into employment contracts with multiple institutions and he/she can work in research, development, and education according to his/her role in each institution. By accepting faculty members from universities and other institutions and transferring AIST researchers to universities and companies, AIST is expected to increase the mobility of human resources and, as the core of the innovation ecosystem, smoothly promote social implementation toward practical application and the creation of new industries by drawing on the excellent technological seeds generated from basic research at universities and other institutions.

Currently, 31 researchers from 12 universities, 3 private companies, and 2 institutions have been accepted, and 10 researchers have been sent to 4 universities, 1 private company, and 3 institutions (as of April 2024).

AIST Research Assistant Program

With the purpose to develop human resources with world-class, high-level expertise and high competency to perform in diverse situations in society, AIST has established the AIST Research Assistant Program to hire graduate students with high levels of ability. This program allows talented graduate students to focus on their research activities to earn a degree without financial concerns. In addition, it gives them opportunities to participate in AIST's R&D activities of high social needs, from which they can develop the ability to plan and conduct advanced research appropriately at the professional research site.

In FY 2023, 429 graduate students conducted R&D at AIST.

●Employment requirements for AIST Research Assistants

(as of June 2024)

Candidate	Graduate students in master's programs	Graduate students in PhD programs
Requirements	R&D abilities that may help to promote AIST's R&D projects and capability to work independently under staff guidance.	Superb R&D and paper-writing abilities that contribute highly to the promotion of AIST R&D projects, and capability to work independently under staff guidance.
Days of employment	Avg. 4-14 days/month	Avg. 10-14 days/month
Salary	1,700 yen/hour (approx. 90,000 yen/month for 7 working days)	2,100 yen/hour (approx. 220,000 yen/month for 14 working days)
Number of graduate students employed (FY 2023)	429	

Technical Training

See page 35 for more details. ▶

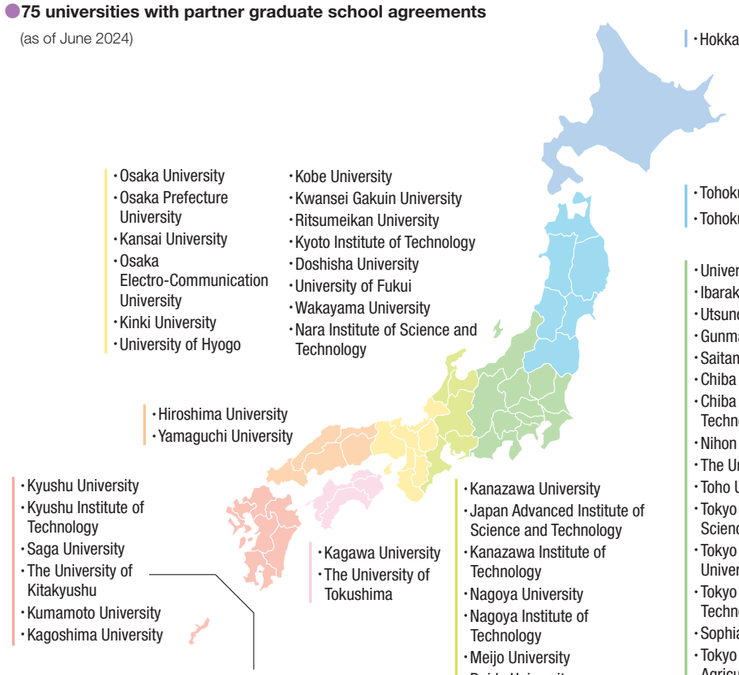
The technical training is a program in which AIST accepts researchers, engineers, and students from companies, universities, and public research organizations for defined periods and provides them with an opportunity to study technologies under the instruction of AIST researchers. The program may also be used for the purposes of short-term research training (internships) and educational programs for academic credits, which are both designed mainly for university students.

●Partner Graduate School Program

Using the knowledge and experience gained at AIST, AIST researchers teach as visiting scholars at graduate schools that have cooperation agreements with AIST. Within this program, AIST also provides technical training to the graduate students on the site of AIST. This program is deemed to be part of the students' academic degree programs.

●75 universities with partner graduate school agreements

(as of June 2024)



- Hokkaido University
- Tohoku University
- Tohoku Gakuin University
- Yamagata University
- Fukushima University
- University of Tsukuba
- Ibaraki University
- Utsunomiya University
- Gunma University
- Saitama University
- Chiba University
- Chiba Institute of Technology
- Nihon University
- The University of Tokyo
- Toho University
- Tokyo University of Science
- Tokyo Metropolitan University
- Tokyo Institute of Technology
- Sophia University
- Tokyo University of Agriculture and Technology
- Rikkyo University
- Aoyama Gakuin University
- Meiji University
- Waseda University
- Ochanomizu University
- Shibaura Institute of Technology
- University of Electro-Communications
- Tokyo Denki University
- Tokyo City University
- Chuo University
- Nagaoka University of Technology
- Shinshu University
- Shizuoka University
- University of Yamanashi
- Yokohama National University
- Yokohama City University
- Kanagawa Institute of Technology
- Tokai University
- Kanto Gakuin University
- Niigata University of Pharmacy and Life Sciences
- Kanazawa University
- Japan Advanced Institute of Science and Technology
- Kanazawa Institute of Technology
- Nagoya University
- Nagoya Institute of Technology
- Meijo University
- Daido University
- Aichi Institute of Technology
- Chubu University
- Gifu University
- Gifu Pharmaceutical University
- Osaka University
- Osaka Prefecture University
- Kansai University
- Osaka Electro-Communication University
- Kinki University
- University of Hyogo
- Kobe University
- Kwansei Gakuin University
- Ritsumeikan University
- Kyoto Institute of Technology
- Doshisha University
- University of Fukui
- Wakayama University
- Nara Institute of Science and Technology
- Hiroshima University
- Yamaguchi University
- Kagawa University
- The University of Tokushima
- Kyushu University
- Kyushu Institute of Technology
- Saga University
- The University of Kitakyushu
- Kumamoto University
- Kagoshima University

AIST Innovation School

AIST Innovation School aims to develop research personnel who can contribute to the creation of innovation in society at large. In order to solve diverse social issues, it is important to create innovative technologies by integrating ideas and technologies inside and outside the institute, and key research personnel are needed to promote this process. Therefore, AIST actively accepts postdoctoral researchers and graduate students and provides them with lectures and exercises to learn and nurture the three skills: “research skills” to promote social implementation-oriented research, “collaboration skills” to cooperate with researchers in different fields and companies, and “people skills” to communicate and present appropriately.

In FY 2023, 16 students enrolled in the “human resources for innovation course” for postdoctoral researchers, a program consisting of lectures, exercises, and long-term corporate training. In addition, as a training program for graduate students, a six-month “basic research skills development course” was conducted online, and 31 students participated in the program, which included lectures, exercises, and participation in external presentations.

The President’s final lecture

●Main Curriculum of the Innovation School

1 Lectures and exercises at AIST

- Postdoctoral human resources expected by companies
- Intellectual property training
- Research ethics
- Companies and industries
- Examples of AIST research (goal-oriented basic research, applied research, social implementation research, integrated research, standardization, etc.)
- Research project planning workshop
- Presentation skills that are understandable to listeners regardless of their position or expertise
- Manners and communication training
- Exercise on career development
- Coaching for interdisciplinary collaboration
- Data science

2 Training at AIST

- Practice of research in laboratories

3 Corporate training

(2 months or more, part of the training course of “human resources for innovation”)

- Understand the concept and approach to research and development in a company, and the importance of cost consciousness and business mindedness
- Experiencing the importance of teamwork and collaboration with other departments

Since its opening, the school has accepted a total of more than 700 people in both courses. School graduates are active in a variety of fields, including business, universities, and public research institutions. In FY 2023, we held an event in Tokyo in collaboration with the “Osho Club,” an alumni group organized by graduates of the Innovation School, to grasp the status of their activities and to help current students understand their possible career paths.

●Expanding the horizons of young researchers

The school students commented, “Through the lectures and communication among school students, I was able to make connections with school students from various universities in different fields of expertise,” “Through research at AIST, I was able to experience cutting-edge research for practical application,” and “During the corporate training, I understood the importance of cost-conscious R&D efforts.” As shown above, the school students' perspectives as research personnel have been broadened.

AIST Design School

The Design School is operated to foster human resources who will become co-creation leaders who will create the next society through social implementation of technology. The master course is an 8-month comprehensive course for companies, public institutions, and AIST staff, while the short and one-session courses are offered exclusively for AIST staff. The outline of the master course is as follows.

The promotion of innovation requires the verbalization of the objectives, beliefs, and values of an organization and its members, as well as the raising and co-creation of new values for society. In this program, each participant verbalized what he or she wanted to accomplish and what actions should be taken to achieve it, and then formed a project team consisting of participants with different affiliations and experiences, and learned through experience to co-create to improve the current situation by exploring social issues and finding solutions. As in the real world, the participants were able to confirm and understand the objectives of each team member from a situation with no clear answers, and acquire the attitudes and competencies required for “co-creation leaders” who aim for a better society through the social implementation of technology.

In September, the students visited the Danish Design Center, KAOSPILOT, the most exciting business school in Denmark, and ALS ELECTRONICA, a festival of art and technology that proposes a future society. At these places, the students were able to catch up with the latest trends through dialogues with people engaged in cutting-edge activities, and deepen exchanges through workshops organized by the students. In addition to strengthening public relations to increase awareness and participation, AIST also worked to enhance the value of the program by acquiring certification from the Ministry of Economy, Trade and Industry for the Fourth Industrial Revolution Skills Acquisition Course.

●Competencies to be developed

- Construct a firm axis of self and understand oneself deeply (introspective, axial strength)
- Awareness of one’s own cognitive limitations and the ability to explore the world from new perspectives (bird’s-eye view, exploration)
- Through rich dialogue, deeply empathize with and understand others and society (dialogue skills, empathy).
- Co-create new value for society and lead the world (co-creation, execution skills)
- Attitude to tolerate unanswerable situations (negative capability)

●Main Curriculum of Design School

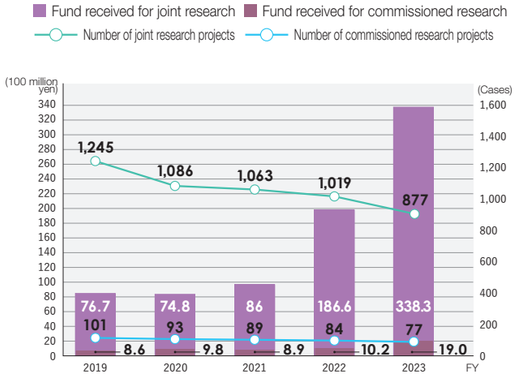
- Dialogue to approach the essence
- Creative leadership training in collaboration with KAOSPILOT (confirmation concluded in 2019)
- Development of aspiration, the interface between the individual and society
- An insight into a possible future by Hitotsubashi University professor
- Idea generation and prototyping by a professor of the University of Tokyo who taught at the Royal College of Art (RCA) for many years
- Team project formation by members from different backgrounds and project design through practice, etc.

R&D Promotion Data

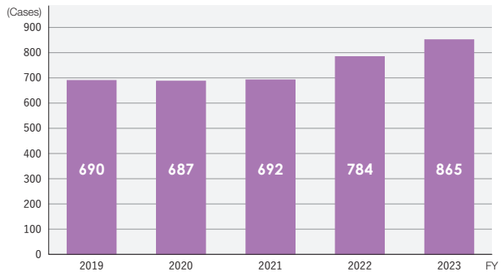
R&D related data

Acceptance of external researchers for joint research

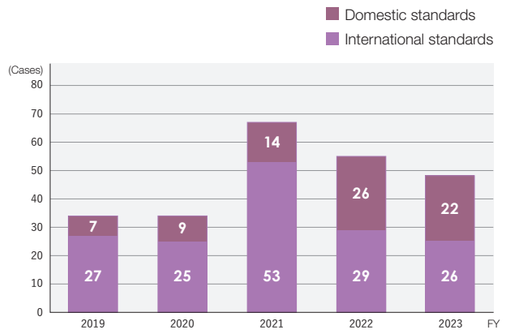
Joint and commissioned research with companies



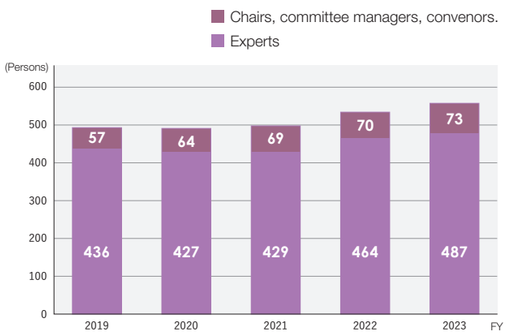
Number of technology consulting



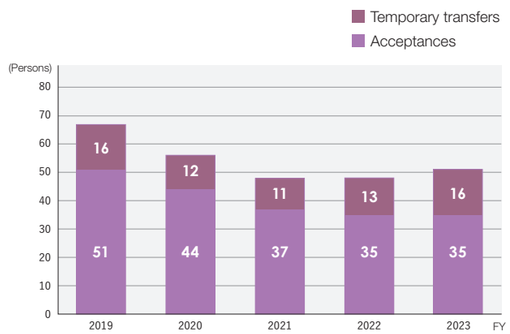
Number of proposed standards



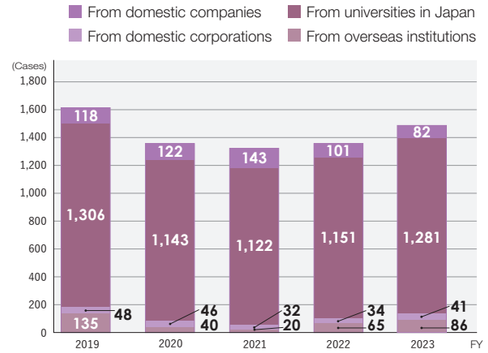
Number of AIST staff to international standardization activities



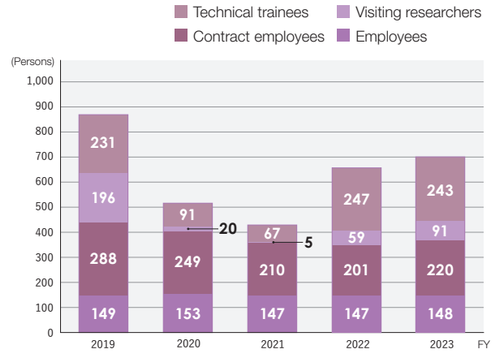
Number of cross-appointment program users



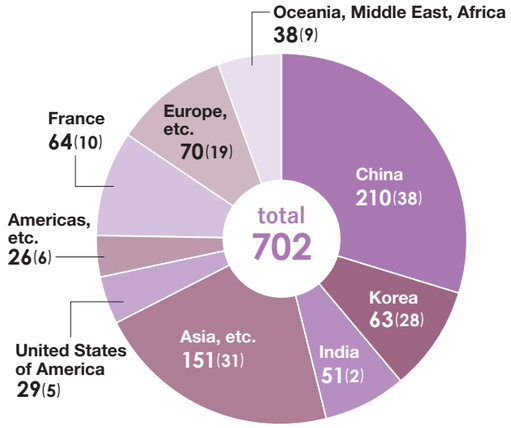
Number of trainees on technical training



Number of foreign researchers



Number of foreign researchers by country and region (FY 2023)



*Numbers in parentheses are those with employee status.

Human Capital Management

Basic Concept

Basic Approach to Human Resource Management

Japan is currently facing a variety of social challenges, such as energy and environmental constraints, low birthrate and aging population, disaster prevention, and countermeasures against new coronavirus infections, for which solutions are strongly needed. Looking at the world, a major transformation is taking place in which digitalization is spreading to all aspects of society through the development and social implementation of technologies such as IoT, big data, and AI.

AIST is required to utilize its comprehensive capabilities to promote active and interdisciplinary research and development in response to increasingly complex social issues and extremely rapid changes of the times, in other words, to create innovations that contribute to "solving social issues and strengthening industrial competitiveness" as stated in its mission.

In order for AIST to continue to be an entity capable of achieving this mission in accordance with the fifth management policy, it is essential that AIST significantly strengthen its innovation creation function and play a central role in the innovation ecosystem of Japan as a whole. To do this, we need diverse and highly skilled human resources, including those who conduct outstanding research, those who create synergy effects, and those who promote social implementation.

To this end, AIST is promoting human resource acquisition (recruitment), personnel evaluation, career path/talent development, and the creation of a comfortable workplace, with the two pillars of improving human resource capabilities and enhancing engagement.

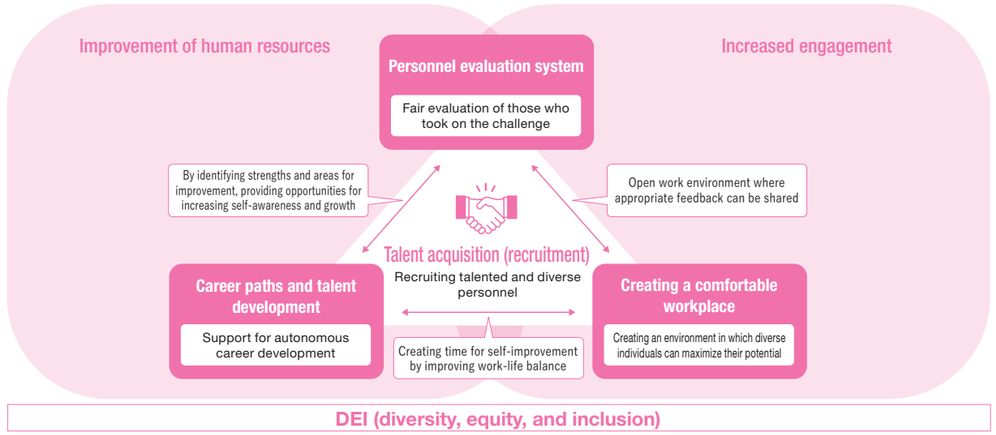
AIST has approximately 2,200 researchers, one of the largest in Japan, and approximately 700 research supporters. Including external researchers involved in specific research projects, more than 10,000 people are involved in world-leading research on a daily basis.

In order to attract even more diverse human resources in the future, we have recently begun hiring highly specialized technical and engineering personnel with different perspectives and backgrounds. In order to provide an environment in which each of these diverse employees can maximize their abilities, we have established a personnel evaluation system to fairly assess those who take on challenges and support autonomous career development. We also promote the development of an environment that facilitates active involvement of diverse human resources, including the promotion of flexible work styles.

By hiring a diverse workforce and implementing initiatives focused on improving human resource capabilities and engagement, we aim to improve the performance of the institute as a whole, enhance the value of AIST, and provide valuable results to society.

Through these efforts, we will continue to strengthen our R&D system and contribute to the development of highly skilled research personnel in Japan.

Basic Approach to Human Resource Management



Engagement Survey Results

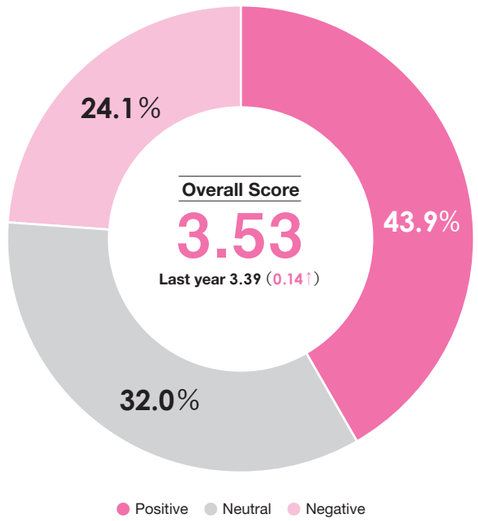
To improve organizational performance, it is necessary to make the workplace a place where all staff members are motivated to work, in other words, to improve engagement. In order to understand the state of engagement in the organization and link it to improvement measures, we started an engagement survey in FY 2021.

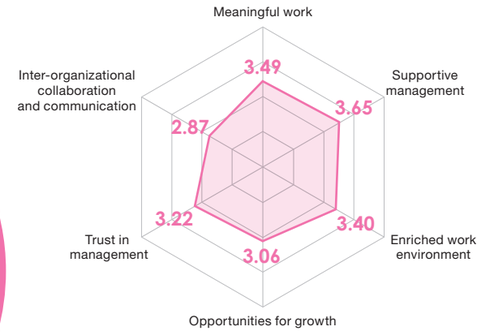
We intend to conduct an engagement survey of regular and contract employees to identify organizational strengths and challenges, and to further improve engagement. We will continue to conduct the survey over time and make fixed-point observations.

The results of the six topics in the question content showed the highest score for "supportive management" and the lowest score for "inter-organizational collaboration and communication."

While the strengths of "high expectations and satisfaction with work content" and "good communication within their departments" were observed, it was confirmed that there were problems in "opportunities to express opinions when new rules are decided" and "cross-departmental information collaboration." We believe that this is largely due to the impact of various organizational reforms within AIST in response to changes in the external environment. In the future, we will aim to communicate more carefully than before by combining a top-down approach, in which information is disseminated from management and corporate departments, and a bottom-up approach, in which measures considered at the field level are picked up.

Engagement Survey





Survey period	Late December 2023–mid-February 2024
Respondents	Regular and contract employees (including seconded staff)
Overall response rate	75%
Questioned content	(1) Meaningful work (2) Supportive management (3) Enriched work environment (4) Opportunities for growth (5) Trust in management (6) Inter-organizational collaboration and communication

Items that improved from the previous year include those related to personnel evaluation, such as evaluation validity and process evaluation, as well as career-related items such as career paths and career support environment. The reasons for the score improvement can be attributed to the introduction of an appraisal salary increase system, which determines the range of salary increase based on performance, instead of the conventional uniform salary increase, and to the introduction of a career plan survey to promote individual autonomy.

However, scores are still low, and we will continue to work to improve them.

Diversity

Basic Approach to DEI Promotion

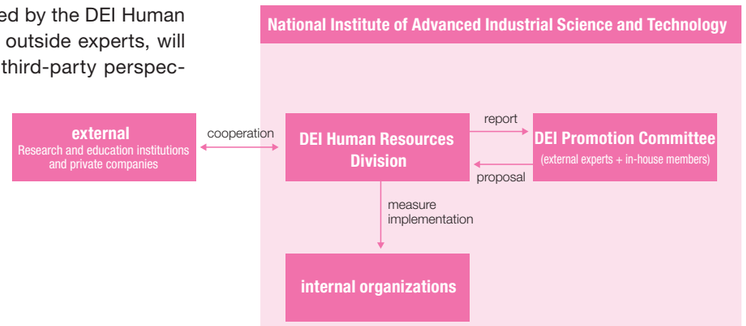
AIST believes that promoting Diversity, Equity, and Inclusion will enhance the value of AIST. In order to create innovative ideas that lead to innovation, it is necessary for diverse people to maximize their individual qualities and abilities. To this end, it is important to gather a diverse range of people, including those who have not been part of AIST in the past, provide fair opportunities to them, and create an environment where each individual can work with a sense of unity while demonstrating their individuality.

The DEI Human Resources Division was established in January 2024 by integrating the Human Resources Division and the Diversity and Equal Opportunity Office in order to more strongly promote DEI. It aims for human resource management based on DEI, and speedy management of human resource measures.

The mission of the DEI Human Resources Division is to build an environment where everyone working at AIST is respected and can demonstrate their abilities to the fullest. We aim to improve AIST's performance by promoting DEI through recruitment of diverse human resources and support for career building, just evaluation of those who have taken on challenges, and development of an environment where diverse human resources can demonstrate their full potential.

DEI Promotion Structure

The DEI Promotion Committee, led by the DEI Human Resources Division and including outside experts, will promote DEI while incorporating third-party perspectives.



Message from the person in charge

AIST is one of the largest research institutes in Japan with approximately 2,200 researchers, producing the world's most advanced research on a daily basis.

Needless to say, we believe that human resources are the most important factor in producing research results based on the AIST vision and in promoting social implementation and intellectual infrastructure development.

We will continue to respect diversity and build an environment where everyone working at AIST can maximize their abilities.

This will create a virtuous cycle in which the skills of human resources are utilized to the fullest extent, and the individual strengths brought out will improve the performance of the institute as a whole, leading to further utilization of human resources.

Chikako Yoneyama
(Director, DEI Human Resources Division, General Affairs Headquarters)

Major Action Plans and Initiatives for Diversity Promotion

1 Realization of work-life balance

Target

Promote work-life balance support measures and workplace environments that enable each and every AIST employee to work in harmony with their work life and reduce career loss due to life events.

Main implementation status in FY 2023

- In place of the previous teleworking system for childcare support, a new teleworking system was introduced in May 2023 to enable more flexible work styles. Currently, teleworking is taking root, with approximately 38% of regular employees using the teleworking system in December 2023.

2 Promotion of female employees and expansion of employment of female researchers

Target

Promote efforts to motivate and raise the awareness of employees and improve the workplace environment to support the promotion of women to management positions. Promote proactive public relations activities and initiatives tailored to the actual situation in each research area to recruit female researchers. Aim to maintain the ratio of female managers at 12% by the end of the period (March 31, 2025) and the ratio of female researchers at 18% cumulatively (April 1, 2020–March 31, 2025). (Targets in the Action Plan for the Act on the Promotion of Women's Active Engagement in Professional Life)

Main implementation status in FY 2023

- The percentage of female managers was 12.7% (56/442) (as of March 31, 2024).
- The ratio of female researchers is 14.2% (18/127) (FY 2023 entrants), and the 5th term cumulative total of female researchers is expected to be 20.5%.

3 Support for the performance of people with disabilities

Target

To further support people with disabilities so that they can play an active role as members of society by creating a comfortable work environment for them and promoting their employment in compliance with the legally mandated employment rate.

Main implementation status in FY 2023

- Achieved the legally mandated employment rate of 2.6% in FY 2023. Eight new employees were hired through open recruitment at Hello Work and referrals from employment support centers for persons with disabilities.
- We have improved facilities including installation of handrails, upgraded stairway evacuation vehicles for the physically challenged, and eliminated steps in the sidewalks of the roads in the premises to create a barrier-free environment that makes it easier for employees with disabilities to work.

4 Support for foreign nationals

Target

To support the recruitment and acceptance of excellent foreign researchers, AIST will increase awareness of AIST among foreign researchers by, for example, preparing information for foreign researchers on the English version of the official website.

Main implementation status in FY 2023

- The percentage of foreign nationals hired for research positions in FY 2023 was 13.8% (18/130).
- In addition to holding Japanese language seminars for foreign researchers and host employees, Japanese language classes were held online to support their daily lives, with 40 participants, including foreign researchers affiliated with regional research bases. In addition, the AIC Community Café was held five times as a place for foreign researchers to make connections with other employees.

Human Resource Development

Internal Human Resource Development

●Basic idea of internal human resource development

Internal human resource development is an important measure to support the achievement of AIST's mission, the sustainable growth and innovation of the institute as a whole. AIST has established diversity, equity, and inclusion as its basic principles, and has created an environment in which all AIST employees can maximize their individual abilities.

Since AIST needs diverse and highly skilled human resources to achieve its mission, we respect individual autonomy rather than uniform career development, and have established a training system and various career paths to foster diverse human resources.

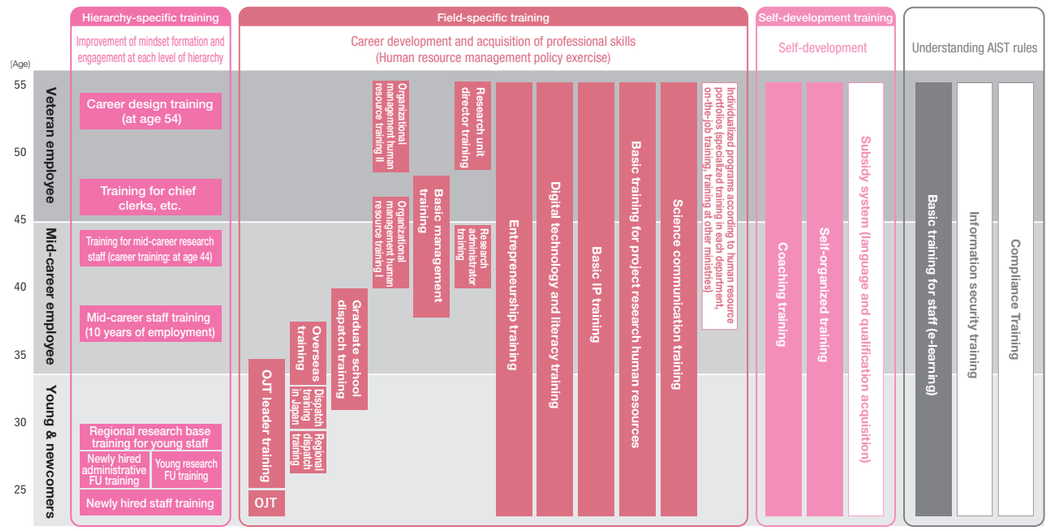
In addition, we are working to create a culture of nurturing human resources by breaking down barriers between job types and departments and assigning personnel based on their aptitude. Recently, we have established a plan for developing researchers who have finished master's courses.

●Training system

AIST provides training in four areas: "hierarchy-specific training" to acquire the knowledge and abilities required for job performance at specific job levels; "field-specific training" to acquire knowledge and skills in specific fields, improve job performance, and design career paths; "self-development training" to provide opportunities for self-development through self-improvement and practical work; and "basic training for staff" to ensure a thorough understanding of AIST's organizational ethics and rules. AIST has provided training for a total of over 13,000 AIST employees.

In addition to the above, we also provide training specific to each department (e.g., Research DX training).

●Human resource development system chart



●Training list

By trainiang	Purpose	By trainiang	Purpose
Hierarchy-specific training	To acquire the knowledge, abilities, etc. required for job performance at each specific level. Example: Training for newly hired staff, training for young staff at regional research bases, training for mid-career staff	Self-development training	To provide opportunities for self-development through self-study or practical work. Example: Self-planned training
Field-specific training	To acquire the knowledge, skills, etc. in specific fields (industry–academia–government collaboration, intellectual property, human resources, etc.) to improve one's ability to perform one's duties and design a career path. Examples: Basic intellectual property training, entrepreneurship training, digital technology and literacy training, training for research managers, training for graduate school dispatch	Basic training for staff	To ensure awareness of AIST's organizational ethics and rules. Example: AIST overview, management and utilization of research results, labor management training

●Diverse career paths

In addition to providing a variety of training programs, we started a career path model example and career plan survey in FY 2023 with the aim of fostering awareness of autonomous career development and promoting talent management.

In the career path model, we categorized the human resources to be aimed for into three categories and visualized a typical career path for each category with examples.

In addition, the survey on reassignment preferences, which had previously been conducted separately for each job category, has been consolidated into a single "career plan survey" for all employees, and updated to include content that will make them even more aware of autonomous career design.

We believe that by this the individual autonomy of diverse human resources is respected, and it contributes to the improvement of each employee's engagement and the realization of management policies.

〈Career path model〉

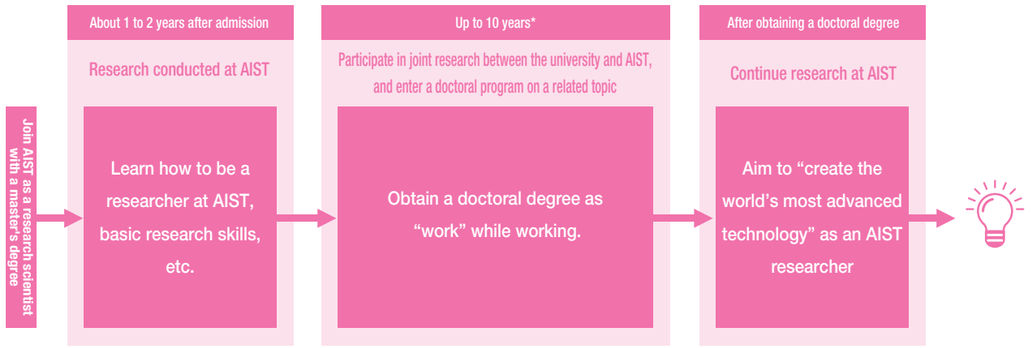
1. "Research implementation related" to conduct high quality research, expand research presence and social implementation
2. "Social implementation promotion related" to promote social dissemination of research results
3. "Management related" to formulate organizational and research policies and strategies, and manage the institute

●Expand employment of master's degree holders and create a training and support plan for master's research employees

The number of students enrolling in graduate school doctoral programs in Japan has been on a long-term downward trend since peaking in 2003. Therefore, while continuing to maintain and strengthen our research base by recruiting excellent doctoral personnel, we have begun recruiting master's degree holders for research positions in all research fields, etc. from the fall of 2023 as a new measure to secure human resources.

In conjunction with the expansion of employment of master's degree researchers, AIST established the "AIST Training and Support Plan for Master's Research Employees" in FY 2023 to foster independent research personnel in collaboration with universities through a process in which hired master's degree researchers obtain a doctoral degree on a related topic in addition to their research at AIST. In this plan, the acquisition of a doctoral degree is positioned as a job, and master's graduate researchers study in the doctoral program while working at AIST, and AIST pays all expenses to acquire a doctoral degree.

Through these efforts, we will continue to strengthen our R&D system and contribute to the development of highly skilled research personnel in Japan.



*Obtain a doctoral degree within 10 years of entering AIST and within 5 years of commencing studies

●Number of employees hired in the past 5 years

(Persons)

	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024 (only those who started wor on April 1)
Research position	94	81	82	97	128	130
Of which, master's degree holders	8	6	7	9	7	18

Human rights

Many people work at AIST, including officers, permanent employees and contract employees, as well as temporary employees, visiting researchers, technical trainees, contractors, visitors participating in industry–academia–government programs, and visitors participating in international programs. Everyone performs their duties with the awareness that it is important to have an attitude of respect and support for each other, regardless of title or position.

Protecting Human Rights in Research

AIST conducts ergonomic research involving human subjects, and medical research carried out in compliance with our Ethical Guidelines for Medical and Biological Research Involving Human Subjects.

In FY 2023, we implemented 164 research projects involving ergonomic experiments and 109 medical research cases.

Regarding an ergonomic experiment, the experimental protocol is reviewed based on opinions of the Committee on Ergonomic Experiments, which consists of external members, in accordance with the Declaration of Helsinki* to ensure the safety and scientific validity of the experiment. Likewise, a medical research experiment is reviewed in accordance with ethical guidelines based on the opinions of the Bioethics Committee consisting of external members.

When an experiment is performed, its participants are given thorough oral and written explanations of the details of the experiment and of their right to revoke consent. In this way, we ensure that their human rights and dignity are protected.

* Subtitled "Ethical Principles for Medical Research Involving Human Subjects," this is a code of conduct regarding human subjects adopted by the 18th World Medical Association General Assembly in Helsinki. Medical researchers have established this rule to regulate themselves with regard to medical research involving human subjects.

Harassment Prevention

Harassment stains a person's personality and hurts the dignity of the person being harassed and causes emotional distress and disadvantage. Not only the person harassed but also those who learn of the presence of harassment may suffer from reduced motivation to work, and the loss such as adverse effects on the results of research and resignation of talented people can be immeasurable. AIST has internal rules in place and provides training to make the workplace free of harassment.

In addition, training is provided for counselors at each research bases, etc., on the prevention of harassment and how to respond when consulting on harassment.

●Harassment prevention measures

- AIST has in place rules for handling harassment and has defined procedures for the prevention of harassment.
- In addition to conducting training on harassment prevention in the basic training for all employees, we also hold a seminar on harassment prevention targeting all employees to enhance awareness. AIST provides counselors placed at AIST work sites with training on how to prevent harassment and provide counseling for harassment victims.

●Counseling system

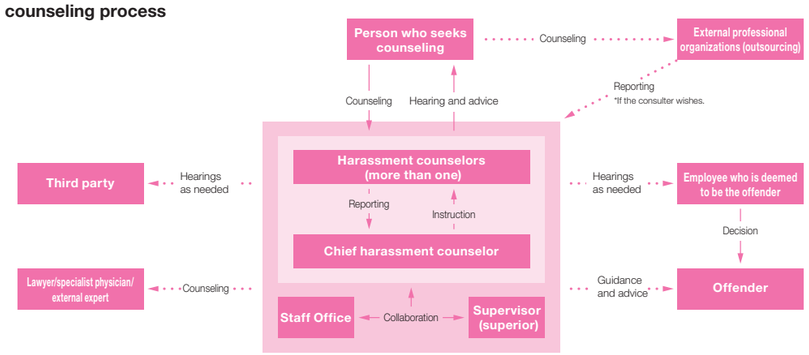
Each research base has workplace harassment counselors. The counselors work to counsel, investigate, and mediate so that harassment victims are not distressed and suffer alone as a result of their experience. If the line of management or a counselor cannot address a harassment issue, it is possible to file to the Compliance Promotion Committee for the recovery from the disadvantages suffered. The committee reviews the issue and recommends the appropriate actions, which are then taken.

In addition, we have established an external counseling organization and made counseling by email, telephone or face to face or online interview possible to make it easier to seek counsel and protect privacy.

●Training programs provided on harassment in FY 2023

Training program, etc.	Trainees	Objectives	Number of participants (FY 2023)
Newly hired staff training	New AIST employees	As part of the training for necessary awareness, basic knowledge, and basic skills to perform their work, employees learn the basics and preventive measures for harassment.	197
Basic training for staff (e-learning) *Including basic training for foreign employees	Persons working at AIST	As part of acquiring basic knowledge of AIST's organizational ethics and rules, participants learn the basics and preventive measures for harassment.	6,874
Training for harassment counselors and others (online training and e-learning)	Harassment counselors	The program provides knowledge on harassment prevention and interviewing skills as a counselor.	29 123(Views)
Harassment prevention seminar	AIST employees who wish to attend	Participants learn about the basics of harassment and how to prevent it.	For general staff: 417 For managers: 188

●Flow of the counseling process



*Those who seek counseling can include people other than the employees involved (i.e. they can be the employee who is deemed to be the offender, the employee who is deemed to be the victim, or someone else, such as a colleague or a supervisor).
*Counseling can be sought by means of a face-to-face meeting, telephone call, email, letter, or fax. (contact by email, telephone, or online with external specialized organizations)
*Seeking counseling causes no disadvantage.
*Adequate consideration is given to the protection of privacy, and any information acquired in the course of counseling is kept strictly confidential.

●Harassment counseling cases

(Persons)

	FY2021	FY2022	FY2023
Sexual harassment	2	1	3
Power harassment	18	15	18
Total	20	16	21

Safety and health

As would be expected in laboratories, AIST uses substances and equipment that may affect the human health and the environment, such as various chemical substances, high-pressure gases, radioisotopes, genetically modified organisms, nanomaterials, laser equipment, and various experimental equipment. Accordingly, AIST creates a work environment in which all people working there can do so in a safe and healthy manner.

Occupational Safety and Health

●Safety and Health Committee and distribution of "Accidents and Safety and Health Information"

The Safety and Health Committee meetings attended by labor and management representatives are held monthly to discuss safety and health issues. Each month, "Accidents and Safety and Health Information," which includes information on past accidents, hazard prediction training, and hazard experience training, is streamed over the intranet. By making it mandatory for all employees to view online streaming, we work on increasing safety awareness.

●Establishment of Safety and Health Guidelines

Safety and Health Guidelines set out precautions on handling hazardous chemicals and high-pressure gas cylinders, disposal of research wastewater, fire, and disaster prevention.

Serving as the basis for employee safety education and for laboratory work, these guidelines are reviewed and revised as needed.

●Emergency preparedness

AIST conducts disaster, fire, and other security drills so that we can promptly respond to emergencies such as disasters and accidents, thereby minimizing damage. We also perform safety confirmation drills, using our "safety confirmation system*" for quick and smooth grasping of the safety of employees.

To ensure a means of communication with each regional research base in the event of a disaster, we also conduct emergency communication drills, using Microsoft Teams and emergency radiotelephones installed at those bases. As part of preparedness for disasters such as large-scale earthquakes, we stockpile food, rescue equipment, and other emergency supplies which are inspected and refreshed on a regular basis.

*In the event of a disaster, the safety confirmation system automatically sends bulk safety confirmation emails to executives and employees. It automatically collects the results and displays them on the web.

●Preventing occupational accidents

In the event of a work-related accident, an investigation and analyses are conducted to determine the cause, and recurrence-prevention measures are implemented. Information on accidents is communicated to all employees through the “Accident and Health and Safety Information” to prevent similar accidents.

AIST holds a National Safety Information Liaison Meeting connecting the Environment and Safety Division with each research base, using a web conference system, to share information on accidents and near-miss incidents. The aim is to share details of recurrence prevention measures and thus improve safety and health.

The number of occupational accidents in FY 2023 was the same as in FY 2022, and none of them were serious. In order to prevent accidents, we provide safety education to make sure that appropriate protective equipment is worn, prepare work procedure manuals and risk assessment for high-risk tasks, conduct hazard prediction training, and hazard experience training, and enhance sensibility by conducting risk prediction activities to foster safety culture.

●Safety education

AIST accepts many researchers, engineers and students from businesses, universities and the like for cooperative research, technical training and so forth. With a view to preventing accidents, AIST runs various safety training programs and classes, both for employees and for visitors from other organizations. Safety education provided when employees are hired and when there is a change in work details is managed by an internal safety education management system, which allows learning history and program contents to be checked as needed.

Health Management and Mental Health

General and special medical examinations are performed in spring and autumn every year. We strive to increase the percentage of employees who undergo medical examinations by raising awareness that they are required to take these examinations, including health screening. As follow-up care after medical examinations, an industrial physician and industrial health staff provide health advice detecting and preventing employees’ health disorders and illnesses in their early stages. In response to employees’ diverse needs, we also provide health information through health support seminars to raise health awareness, and thus provide support to improve the performance of individual employees and AIST as a whole.

To address mental health issues, we have developed a unified Mental Fitness Program in accordance with the directives and guidelines of the Ministry of Health, Labor, and Welfare. Four programs based on the Mental Fitness Program are implemented in a continuous and planned way. They focus on (1) self-care; (2) line care through implementation of education and training and seminars; (3) care by in-house industrial health staff and others through face-to-face counseling with an industrial physician and industrial health staff and support in returning to work; and (4) care by external resources through the use of external mental health organizations.

We use a stress check system (once a year) to encourage awareness of stress situations of staff and to promote workplace improvement to create a comfortable workplace. By doing this, we are making efforts to strengthen measures to prevent staff from suffering mental health disorder. For the entire AIST, the average stress score has been lower than the national average since the stress check was introduced.

●Outline of return to work program

Submission of medical certificate of absence from work ▶ **Start of leave of absence** ▶ **Care during leave and follow-up during preparation for return-to-work**
- Monthly meetings with industrial physician
- Implementation of return-to-work support plan

▶ **Return to work** ▶ **Follow-up after returning to work**
- Meetings with industrial physician twice a month (for 6 months)

*Depending on the length of leave, etc.

Data relating to human resources

Number of people who used the various leave programs (Persons)

	FY2019		FY2020		FY2021		FY2022		FY2023	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Leave to care for sick children	122	219	89	147	98	153	125	265	169	306
Special childcare leave	39	21	30	13	30	15	33	40	48	43
Extended childcare leave*	15	48	12	35	21	30	36	22	37	29
Nursing care leave	75	59	48	40	48	46	78	111	99	178
Extended nursing care leave*	0	1	1	2	1	2	1	1	0	1

*Number of employees starting the leave within the fiscal year

Number of employees who used child daycare services (Persons)

	FY2019		FY2020		FY2021		FY2022		FY2023	
	Employees	Contract employees	Employees	Contract employees	Employees	Contract employees	Employees	Contract employees	Employees	Contract employees
AIST Tsukuba	834	1,047	473	73	534	241	482	170	393	442
AIST Chubu	93	59	18	11	15	27	24	18	34	14
AIST Kansai	134	45	4	1	38	0	54	4	37	22
Private child daycare facilities and babysitters	43	4	24	0	44	0	49	0	45	0

*Total number

Number of employees (Persons)

	Total	Men	Researcher	Administrative staff	Women	Researcher	Administrative staff
All employees	2863	2269	1905	364	594	247	320
Of foreign nationality	147	113	113	0	34	32	2
With PhD	2036	1788	1788	0	248	246	2

*Number of employees starting the leave within the fiscal year

Number of executives in FY 2023 (Persons)

	Total	Men	Full-time	Part-time	Women	Full-time	Part-time
Executives	10	8	6	2	2	1	1

Newly hired in FY 2023 (Persons)

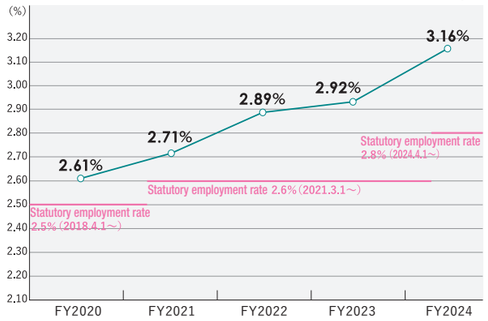
	Total	Men	Researcher	Administrative staff	Women	Researcher	Administrative staff
FY2023	179	128	110	18	51	18	33
FY2022	177	106	83	23	71	14	57
FY2021	122	85	68	17	37	14	23
FY2020	113	78	63	15	35	18	17
FY2019	121	84	66	18	37	28	9

Number of staff in managerial positions (Persons)

	Total	Researcher	Women	Rate	Administrative staff	Women	Rate
FY2023	442	305	24	7.9%	137	32	23.4%
FY2022	432	295	20	6.8%	137	25	18.2%
FY2021	402	292	18	6.2%	110	17	15.5%
FY2020	377	282	11	3.9%	95	11	11.6%
FY2019	380	279	14	5%	101	9	8.9%

Change in employment rates for people with disabilities

% of June 1 of each year

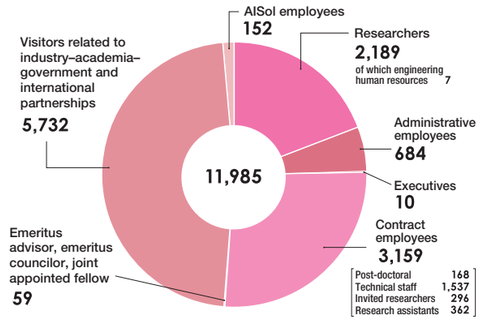


Percentage of people with disabilities remaining at work

	FY2019	FY2020	FY2021	FY2022	FY2023
Number of people at the beginning of the fiscal year	111	110	115	120	119
Number of people who left AIST within the fiscal year	9	4	11	6	10
Employee turnover rate	8.11%	3.64%	9.57%	5.00%	8.40%
Employee retention rate	91.89%	96.36%	90.43%	95.00%	91.60%

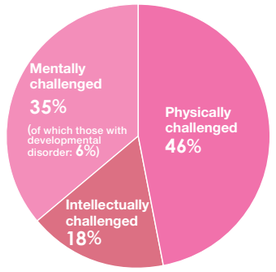
*Retirees include those who retire or those whose term of employment has expired.

Personnel data (Persons)



*As of March 31, 2024. However, number of visitors related to industry–academia–government and international partnerships is of FY 2023.

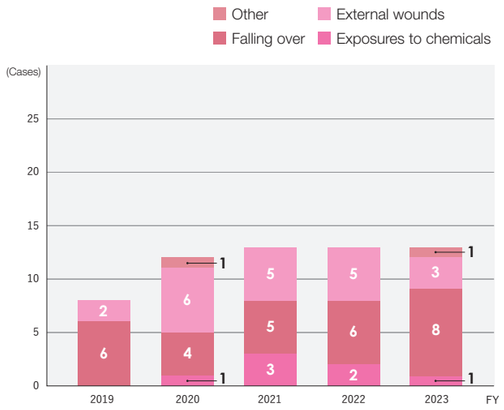
Employment rate by disability type



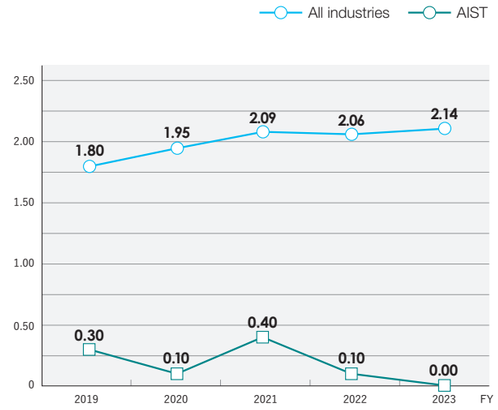
as of June 1, 2024

Health and safety data + Health management data

Trends in the number of occupational accidents



Frequency rate of accidents resulting in absences from work



Calculation method
AIST: (number of applications for compensation for absence from work due to industrial accidents/total number of working hours) x 10^6
All industries: (number of deaths and injuries due to occupational accidents/total number of working hours) x 10^6
*The occupational injury rate for all industries is calculated by limiting the number of casualties to those who lost at least one day of work or lost part of their body or its function due to industrial accidents.

Main education and training programs and workshops in FY 2023

Program	No. of sessions	No. of participants
Hazard experience training (dangers of electrical accidents)	1	19
Course on skills required for a Health Officer's License	2	32
Courses on specialized safety (waste) (e-learning)	–	1,893
Education and training for recombinant DNA experiments (e-learning)	–	1,021
Education and training for animal experiments (e-learning)	–	292
Education and training for life science and medical experiments (e-learning)	–	251
Education and training for ergonomic experiments (e-learning)	–	434
Specific safety training course (radiation) (online workshop / e-learning)	25/–	94/385
Specific safety training course (X-ray) (e-learning)	–	432

Number and percentage of permanent and contract employees who underwent periodic medical examinations (including health screening), 2019–2023

Top: percentage of examinees Bottom: no. of examinees/ total no. of eligible employees

FY	2019	2020	2021	2022	2023
(1) Employees (excluding (2)) *1	99.8%	99.7%	99.7%	99.6%	99.7%
	2,986/2,992	3,021/3,030	2,975/2,984	2,982/2,994	2,889/2,899
(2) Contract employees *2	99.7%	99.9%	99.9%	99.5%	99.7%
	2,569/2,577	2,399/2,401	2,409/2,411	2,426/2,437	2,459/2,466

*1 Excluding those on extended childcare leave and sick leave and those on long leave due to overseas relocation
*2 The target is short-term members of mutual aid association.

Number of permanent and contract employees (including temporary employees) who underwent special medical examinations in FY 2023

	Spring			Autumn		
Special medical examination	Permanent employees	Contract employees	Total	Permanent employees	Contract employees	Total
Medical examination for organic solvent poisoning prevention	676/678	702/702	1,378/1,380	670/670	722/722	1,392/1,392
Medical examination for specified-chemical poisoning	492/492	449/449	941/941	485/485	465/465	950/950
Medical examination for ionizing radiation exposure	322/322	71/71	393/393	319/319	74/74	393/393
Medical examination for lead poisoning	17/17	22/22	39/39	18/18	25/25	43/43
Medical examination for laser injury	326/326	165/165	491/491	58/58	34/34	92/92
Medical examination for pneumoconiosis	8/8	16/16	24/24	0/0	0/0	0/0
Medical examination for asbestos exposure	3/3	2/2	6/6	3/3	3/3	6/6

*no. of examinees/ total no. of applicable employees

Number of employees with significant findings from AIST's medical examinations, and number of employees who received face-to-face counseling

(1) Number of employees with significant findings, and their percentages of the total

FY	2019	2020	2021	2022	2023
With significant findings (D-diagnosis)	140	159	157	169	136
	3.1%	3.7%	3.8%	4.0%	3.4%
With significant findings (E-diagnosis)	817	872	857	849	896
	18.3%	20.6%	20.7%	20.0%	22.6%

(2) Number of employees who received counseling, and their percentages to employees with significant findings

FY	2019	2020	2021	2022	2023
With significant findings (D-diagnosis)	121	130	129	142	119
	86.4%	81.8%	82.1%	84.0%	87.5%
With significant findings (E-diagnosis)	726	779	789	766	842
	88.9%	89.3%	92.1%	90.2%	94.0%

Definition of criteria: A: no anomalies; B: mild abnormalities but no interference with daily life; C: follow-up examination required; D: health advice required; E: treatment required; F: counseling required (applicable only to special medical examinations)

Number of face-to-face health consultations in FY 2019–2023

(Cases)

FY		2019	2020	2021	2022	2023
Industrial physician	Physical	1,439	921	736*	727	954
	Mental	573	525	777*	768	740
Industrial health staff		5,496	5,599	5,414	4,338	3,966
Total		7,508	7,045	6,927	5,833	5,660

* Classification has been readjusted.

Flu shots (at AIST)

(Persons)

FY	2019	2020	2021	2022	2023
AIST Tsukuba/Tokyo	2,000	1,962	0	0	0
Regional research bases	578	640	0	0	0
Grand total	2,578	2,602	0	0	0

Other activities of health management

(Persons)

FY	2019	2020	2021	2022	2023
Exercises to refresh	198	video streaming	video streaming	video streaming	video streaming
Walking lessons	82	*	video streaming	video streaming	video streaming
Emergency first-aid workshops	145	*	video streaming	video streaming	video streaming/60
Mental health seminars	55	146	video streaming	video streaming	video streaming

FY	2019	2020	2021	2022	2023
Workshops (training)	183	239	214	246	308
Anger management workshops	119	43	50	–	–
dental health	–	–	video streaming	video streaming	–
Food and nutrition seminar	–	–	–	video streaming	video streaming

* Due to Covid-19, the event was not held. (Exercises to refresh were conducted via video streaming.)

Environmental safety

AIST delivers the results of its research and development to society with the aim of solving social issues and realizing a sustainable society. In the process of research and development, AIST conducts its business activities in compliance with laws and regulations, while giving due consideration to environmental safety.

See pages 52–55 for more details. ▶

Environmental Policy

AIST has established the Charter of Environment and Safety to make steady progress in environmental considerations and other initiatives. Under the Charter of Environment and Safety, we have also established the Environment and Safety Policy, sharing within AIST that “global and local environmental conservation” and “ensuring the safety and health of all AIST employees” are important issues.

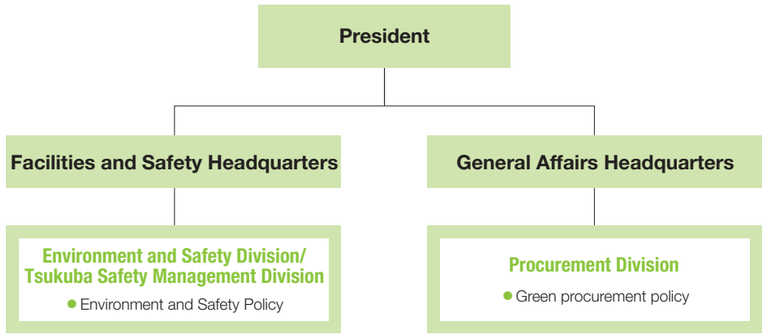
Environment and Safety Policy

1. We proactively conduct research that contributes to conservation of the environment and the development of a healthy and safe society.
2. We comply with laws, regulations, ordinances, and agreements, and strive to protect the environment and to improve health and safety.
3. We seek to reduce the consumption of energy and resources and the generation of waste, and thus aim to reduce loads on the environment.
4. We seek to prevent pollution and work-related accidents, to take prompt and appropriate actions in the event of an emergency, and to prevent the spread of damage.
5. We are conducting activities to ensure environmental conservation, safety and health with the participation of all members of AIST; we seek continuous improvement.
6. We actively disclose environmental, safety and health information by publishing environmental reports and disclosing information to promote communication with society.

We also set a policy for promoting the procurement of eco-friendly goods and services in accordance with the Act on Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities and the Green Purchasing Act.

Implementation Structure of Policies Related to Environment and Safety

Efforts regarding environmental and safety considerations are promoted under the following system.



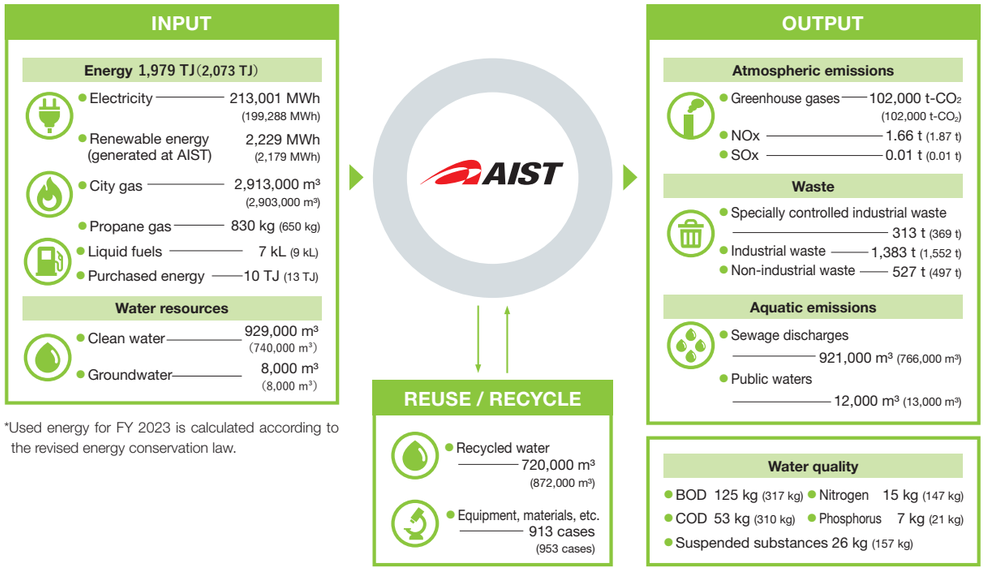
Environmental and Safety Self-check

As a unique initiative, AIST streams “Accidents and Safety and Health Information” (Summary of Incidents and Near Misses (Hiyari-Hatto) and Safety and Health Management) to all employees via the intranet and conducts a monthly “Environmental and Safety Self-check” to check the status of their own safety and health efforts after viewing the information.

We implement the PDCA (Plan, Do, Check, Act) cycle which includes viewing summary of incidents and near misses and safety and health management, implementing safety and health efforts, conducting environmental and safety self-checks, and improving safety education based on inspection results, to ensure the succession of safety and health know-how, reduce potential risks, and prevent accidents.

Overview of Environmental Burdens

( ): results of FY 2023



*Used energy for FY 2023 is calculated according to the revised energy conservation law.

Appropriate Management of Chemical Substances

In order to appropriately manage the wide variety of chemical substances used in our research activities, we have introduced the Chemicals and Gas Management System that enables us to manage the amount of hazardous chemicals and high-pressure gases we possess and use. Through this system, we are also able to ascertain the type and quantity of chemical substances in our possession, and ensure that we comply with laws and regulations and that we properly control the quantity possessed.

●Response to PRTR system

Based on the PRTR system* and ordinances and guidelines of some local governments, we monitor the amount of relevant chemical substances released into the atmosphere and transferred as sewage and waste. For FY 2023, we reported on hydrogen fluoride and its water-soluble salts, ferric chloride, N,N-dimethylacetamide subjected to the PRTR system, methanol and chloroform under the Tokyo Metropolitan ordinance, volatile organic compounds (VOC) in accordance with the Osaka Prefectural ordinance, and ammonia, nitric acid, ammonium hydroxide, potassium hydroxide, and hydrogen peroxide in accordance with Fukushima Prefecture guidelines.

*PRTR system: Pollutant Release and Transfer Register is a system introduced in FY 2001 for reporting the amount of chemical substances released into the environment or transferred out of business establishments as waste, based on the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof. The system requires that the amount of hazardous chemical substances released into the environment and the amount transferred out of business establishments as waste be counted and disclosed to the public. Some local governments have also established similar systems through ordinances.

Consideration for Biodiversity and Animal Welfare

In order to comply with the Cartagena Act* to ensure biodiversity, we provide education and training (e-learning) to personnel engaged in recombinant DNA experiments and a total of 1,021 persons took the course in FY 2023. In addition, we review the content of experiments based on the opinions of the Recombinant DNA Experiment Committee which is composed of outside experts. Furthermore, in principle, on-site inspections are conducted once a year at laboratories conducting recombinant DNA experiments to ensure that the content of the experiments is consistent with the experimental plan and that the experiments are conducted in accordance with the law.

In animal experiments, we examine whether the 3Rs (Replacement: use of alternative methods, Reduction: reduction of the number of animals used, and Refinement: reduction of suffering) stipulated in the Act on Welfare and Management of Animals are taken into account, and we disclose the results of our self-assessment on our official website. In addition, we have undergone external verification by the Japan Pharmaceutical Information Center (JAPIC) and obtained certification for the animal experiment facilities.

*The Cartagena Act: In Japan, the Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms came into effect in 2004. It aims to ensure safe handling of living modified organisms that could have adverse effects on the conservation and sustainable use of biodiversity.

Consideration for Water Resources

●Prevention of water pollution

Wastewater from laboratories is sent to wastewater treatment plants and processed to abide by the Water Pollution Prevention Act and to meet municipal effluent standards. It is then discharged into the public sewerage system. To prevent water containing hazardous substances from leaking into groundwater, AIST builds dikes and conducts periodic inspections of buried research wastewater pipes and groundwater quality to check for abnormalities.

Wastewater treatment facility in AIST Tsukuba

●Use of recycled water

For the efficient use of water resources at AIST Tsukuba and AIST Tokyo Waterfront, research wastewater is neutralized, treated with reducing agents, and reused as recycled water. It is used for cooling laboratory equipment and flushing toilets. In FY 2023, 43% of the total water use was recycled water.

Recycled water tank in AIST Tsukuba

Consideration for Atmospheric Emission

●Reduction of fluorocarbon emissions

In accordance with the Act on Rational Use and Proper Management of Fluorocarbons, AIST conducts periodic inspections and spot checks of refrigeration and air conditioning equipment that uses fluorocarbons as refrigerants, to restrict emissions of fluorocarbons into the atmosphere. In FY 2023, a total of about 624 t-CO_2 was released, and it was less than the amount (more than 1,000 t-CO_2) required to report under the Act.

●Prevention of air pollution

Regarding boilers for air conditioning that are major sources of NOx and SOx, we measure the effluent gases twice a year so that they do not exceed the emission standards under the Air Pollution Control Act. Regarding NOx, in FY 2023, the measurement results were all within the limits. Of SOx, there has been little emission since 2017, and the results fall far below the emission standard. In addition, when replacing equipment, we choose chiller units with high energy-saving effects and downsized units to reduce emissions.

Promotion of 3Rs

AIST is promoting 3R (Reduce, Reuse, Recycle) initiatives to reduce environmental burdens. In particular, since the reuse of research equipment can be expected to reduce costs, AIST has introduced a system to promote the reuse of unneeded research equipment, office equipment, fixtures, and consumables by posting information on its internal website.

○Cases of reuse for FY 2023: 913

Energy-saving Efforts

We work on reducing energy consumption per unit to an annual average of over 1%* in the medium to long term, an amount required under the Act on Rational Use of Energy. To achieve the target, we actively install devices with high energy-saving effect when renovating facilities, in addition to taking energy conservation measures by appropriate temperature settings of air-conditioners. Our existing solar power systems are being used effectively, and renewable energy systems have been installed in our new buildings. Presently solar power systems are installed at AIST Tsukuba, Fukushima Renewable Energy Institute (FREA), AIST Tohoku, AIST Kashiwa, AIST Tokyo Waterfront, AIST Chubu, AIST Kansai, AIST Chugoku, and AIST Kyushu. Wind power generation is installed at FREA.

Regarding photovoltaic power generation, we aim to install photovoltaic power generation equipment in approximately 50% or more of the area available for installation by FY 2030, in accordance with the “Plan for Measures to be taken by the Government for the Control of Greenhouse Gas Emissions in its Affairs and Businesses.” By FY 2023, the installation area of photovoltaic power generation has increased to 16,103 m3 (30% of installable area).

*Average change of energy consumption per unit over the five-year period of FYs 2019–2023: 98.0% (96.4% compared to the previous year)
○Amount of renewable energy generation in FY 2023: 2,228,616 kWh (about 0.8% of total electricity consumption of AIST)

Compliance with Green Purchasing Act

Each year AIST discloses its policy for promoting the procurement of eco-friendly goods and services based on the Act on Promoting Green Purchasing. In accordance with the Green Contract Law, AIST evaluates the price and environmental performance (fuel efficiency) of automobile leases comprehensively and concludes a contract with the party that achieves the best result in the general evaluation bidding method. In the case of electricity and industrial waste, the contract was awarded to the lowest bidder that cleared the standard after evaluating their reduction efforts for global warming gas emission and compatibility to the certification system for excellence.

Response to Environmental Accidents

AIST conducts contact, communication, and emergency action drills at all research bases once a year to minimize damage in the event of an environmental accident such as a leakage of oil or chemicals. We have a system that receives a report and responds immediately in the event of an accident. After expeditious measures, related organizations are notified. The Facilities and Safety Headquarters analyzes the cause of the accident and takes measures to prevent a recurrence of such an incident.

Accident case in FY 2023
Leakage of freezer refrigerant (R407C fluorocarbon)
During a periodic inspection of a refrigeration unit, an inspector found an oil leak, and upon investigation with gas leak detection fluid, bubbles were formed and a refrigerant leak was confirmed. The cause was corrosion of piping connections (welds). As a response, the refrigerant was recovered, and the leaking part was repaired.

Environmental accident drills of FY 2023
13 accident drills conducted across all research bases (Assuming damage to research drainage pipes, leakage during transport of waste fluid, etc.)

Scene of an environmental accident drill simulating a water supply control failure in a rooftop scrubber and water leakage from an overflow pipe joint in a circulation tank

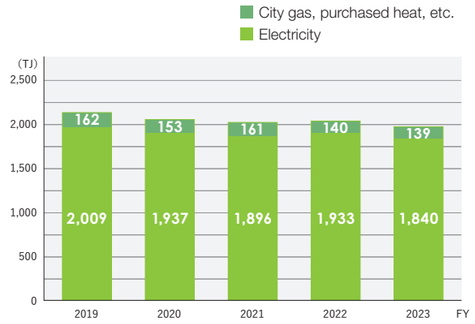
Environmental Education

Monthly Accidents and Safety and Health Information and e-learning is used to educate staff on themes that have impact on the environment, such as how to dispose of waste fluid and emission gas from research, and how to sort and dispose of waste.

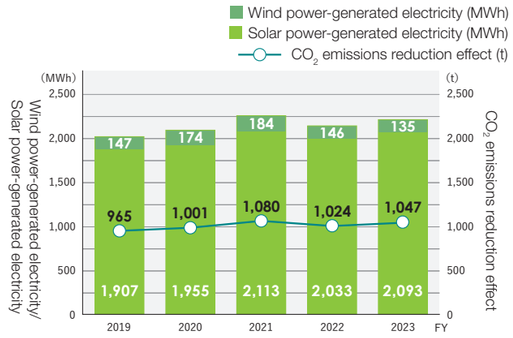
Environmental Reporting Data

Energy

Changes in amounts of energy used



Changes in renewable energy generation and CO_2 emissions reduction



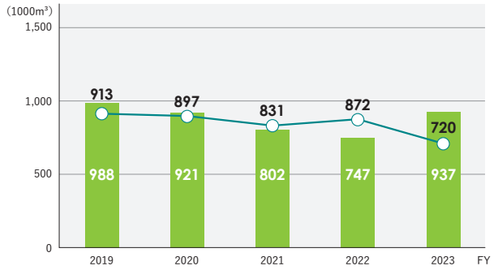
Water resources

Breakdown of water received

Unit: 1000 m³

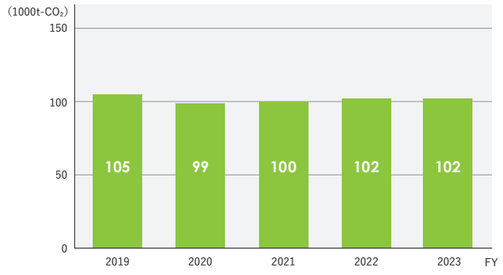
	FY2019	FY2020	FY2021	FY2022	FY2023
Potable water	974	913	795	740	929
Groundwater	14	8	7	8	8
Industrial water	0	0	0	0	0
Received water	988	921	802	747	937
Recycled water	913	897	831	872	720.383

Changes in amounts of water received and reused



Atmospheric emissions

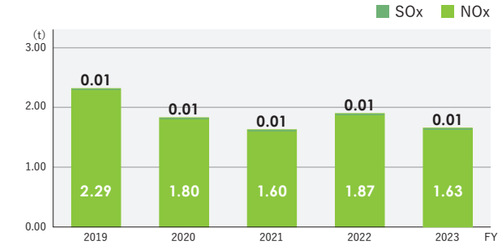
Changes in CO_2 emissions by year



Estimated leakage of CFCs (FY 2023)

Type	R-number	Estimated t-CO_2 released by R-number	Estimated t-CO_2 released by type
HCFC	R22	0	0
HFC	R32	0.803	593.941
	R134a	60.632	
	R404A	42.728	
	R407C	209.568	
	R410A	280.21	
Mixed	Mixed refrigerant	30.507	30.507
Total			624.448

Changes in atmospheric environmental loads

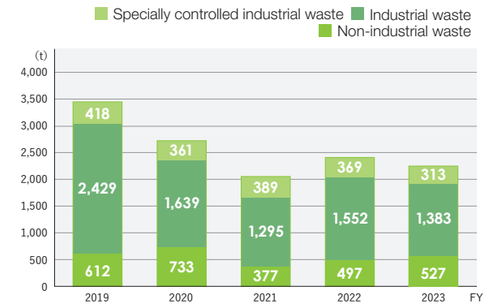


Waste

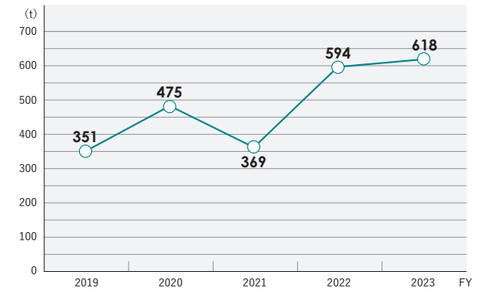
Breakdown of generated waste (FY 2023)

Waste type	Amount disposed of (t)	Amount landfilled (t)	Percentage of waste landfilled (%)
Non-industrial waste	526.7	88.9	16.9
Industrial waste	1382.9	421.9	30.5
Plastic waste	450.1	82.7	18.4
Metal scrap	267.8	25.5	9.5
Sludge	365.1	253.7	69.5
Glass/concrete/ceramic waste	40.2	16.9	42.0
Slag	18.6	1.5	7.9
Other	241.0	41.6	17.3
Specially controlled industrial waste	313.4	106.8	34.1
Flammable waste oil	45.0	3.8	8.5
Strong acids	208.7	65.6	31.4
Infectious waste	15.2	5.9	38.9
Waste oil (hazardous)	4.4	0.4	8.3
Sludge (hazardous)	11.7	9.9	84.7
Acid waste (hazardous)	4.2	0.3	6.9
Other	24.2	20.8	86.1
Total	2,223	618	27.8

Changes in amounts of disposed waste



Changes in amounts of landfill waste



Storage and disposal of PCB-containing items and PCB waste

Waste type	Quantity stored at the end of FY 2021	Quantity added in FY2022	Quantity disposed of in FY 2022	Quantity stored at the end of FY 2022	Quantity added in FY 2023	Quantity disposed of in FY 2023	Quantity stored at the end of FY 2023
Capacitors	156	0	156	0	4	2	6
Electrical ballasts	7	1	8	0	0	0	0
Transformers	2	5	1	6	0	5	5
Oils/paints (L)	0 ℓ	0 ℓ	0 ℓ	0 ℓ	0 ℓ	0 ℓ	0 ℓ
Other contaminated materials	Stored research chemicals, etc.	Added waste cloth used for analysis	Disposed research chemicals and waste cloth used for analysis	Stored research chemicals, etc.	Added waste cloth used for analysis	Disposed research chemicals and waste cloth used for analysis	Stored research chemicals, etc.

Water quality

Monitoring groundwater at AIST Kansai

Sampling month	Measurement of arsenic and other compounds (standard value: 0.01 mg/L or less)	Sampling month	Measurement of arsenic and other compounds (standard value: 0.01 mg/L or less)
2023.4	0.020	2023.10	0.019
2023.5	0.046	2023.11	0.038
2023.6	0.037	2023.12	0.037
2023.7	0.047	2024.1	0.057
2023.8	0.042	2024.2	0.020
2023.9	0.011	2024.3	0.055

Proper management of chemical substances (FY 2023)

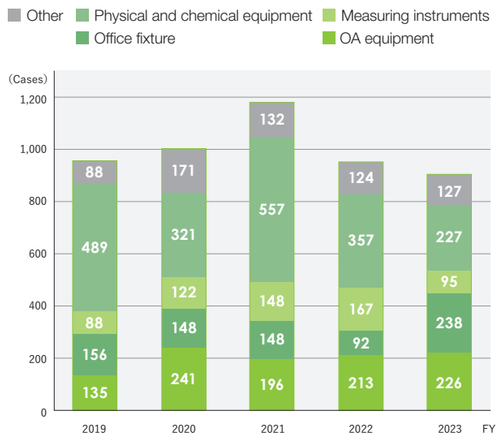
Amount of chemical substances reported under the Chemical Control Program

Research site	Substance	Volume handled	Amount discharged	Amount transferred	
			Atmosphere	Sewer	Waste
Fukushima Renewable Energy Institute, AIST	Ammonia (kg)	3,800	11	0	82
	Ammonium hydroxide (kg)	110	0	0	110
	Nitric acid (kg)	160	0	0	160
	Hydrogen peroxide (kg)	110	0	0	110
	Potassium hydroxide (kg)	120	0	0	120
AIST Tsukuba West	N, N-dimethylacetamide (kg)	970	0	0	2,800
	Hydrogen fluoride and its water-soluble salts (kg)	3,300	0	380	500
AIST Tokyo Waterfront Annex	Chloroform (kg)	100	9.1	0	92.4
	Methanol (kg)	200	6.8	0	194.9
AIST Kansai	VOC(kg)	2,000	80	0	1,900

* AIST Tsukuba West: PRTR Law (AIST Tsukuba West's liquid waste containing N, N-dimethylacetamide was stored in a liquid waste tank for multiple years, and industrial waste treatment was done in 2023.)
AIST Tokyo Waterfront: Ordinance on the Environment to Ensure the Health and Safety of Tokyo Citizens
AIST Kansai: Osaka Prefectural Ordinance on Preservation of Living Environment, etc.
Fukushima Renewable Energy Institute, AIST (FREA): Fukushima Prefecture Guidelines for Proper Management of Chemical Substances (Substances whose handled, released, or transferred amounts are 100 kg or more are listed)

Reuse of equipment, materials, etc.

Number of reuse transactions



Environmental accident drills

Environmental accident drills in FYs 2018–2023.

FY	Number of drills
2018	18
2019	19
2020	19
2021	19
2022	19
2023	13

Green purchasing and environmentally conscious contracts

Procurement results of eco-friendly goods and services

Category	Item		Target value	Total amount purchased	Amount of specified purchase items	Target attainment
Paper	Photocopier paper		100%	10,477.0kg	10,466.0kg	100%
	Forms		100%	4.0kg	1.0kg	32%
	Coated paper for inkjet color printers		100%	451.0kg	359.0kg	80%
	Toilet paper		100%	2,547.0kg	2,545.0kg	100%
	Tissue paper		100%	11,198.0kg	10,558.0kg	94%
Stationery	Mechanical pencils		100%	195	122	63%
	Mechanical pencil leads		100%	235	185	79%
	Ballpoint pens		100%	7,231	6,671	92%
	Marker pens		100%	8,765	8,142	93%
	Media cases		100%	240	237	99%
	Glue (solid) (including refills)		100%	1,740	1,740	100%
	Glue (tape)		100%	635	621	98%
	Files		100%	51,018	50,119	98%
Office furniture, etc.	Chairs		100%	1,023	840	82%
	Desks		100%	487	378	78%
Imaging equipment, etc.	Photocopiers, etc.	Purchased	100%	6	6	100%
		Leased/rented (new)		93	93	
		Leased/rented (continued)	–	–	–	–
	Scanner	Purchased	100%	138	130	94%
		Leased/rented (new)		–	–	
		Leased/rented (continued)	–	–	–	–
	Toner cartridges		100%	3,198	3,076	96%
	Ink cartridges		100%	1,733	1,677	97%
Office equipment, etc.	Paper shredders	Purchased	100%	51	41	80%
		Leased/rented (new)	–	–	–	–
		Leased/rented (continued)	–	–	–	–
Automobiles, etc.	Automobiles	Purchased	100%	6	9	100%
		Leased/rented (new)		9	9	
		Leased/rented (continued)	–	–	–	–
Fire extinguisher	Fire extinguishers		100%	540	540	100%
Service	Passenger transportation		100%	1,018	1,018	100%

*Copiers, MFPs, expandable digital copiers

Types and number of environmentally friendly contracts (FY 2023)

Types of green contracts	Number of cases
Lease of motor vehicles	15
Electricity supply contract	10
Industrial waste	29

Governance

Basic Concept

Improve Governance by Separating Management and Execution

●Basic approach to governance

AIST reviewed its organizational management structure and separated management and execution as of April 1, 2021, in order to establish effective governance to demonstrate its comprehensive strength.

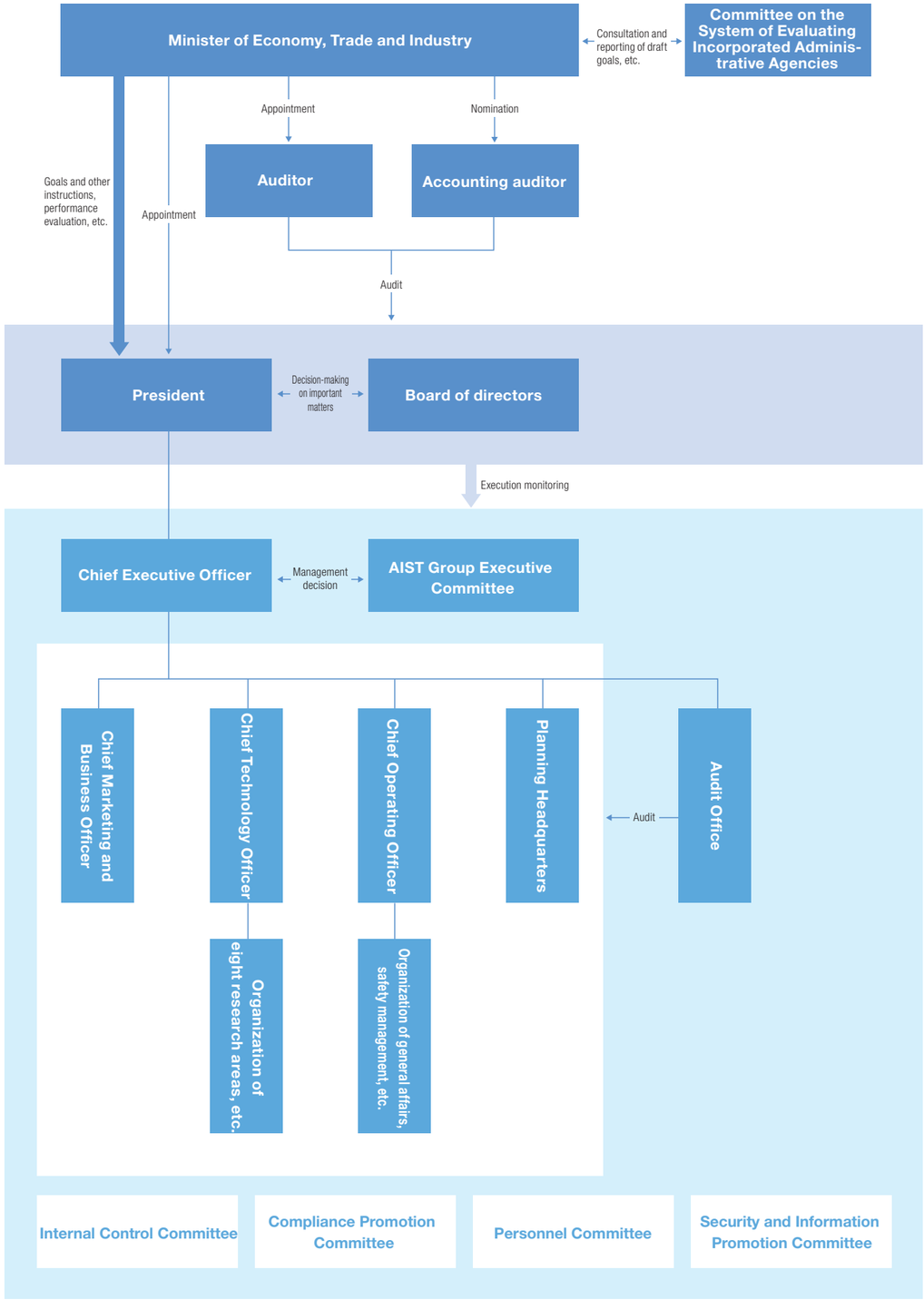
The Board of Directors, established to assist the President in decision-making, focuses on deliberation of important matters related to the overall management of the corporation, and in order to further incorporate an objective viewpoint from the outside, the number of external directors has been increased and now consists of the President, the Senior Vice-President, three internal directors, and three external directors. In order to strengthen the objective executive oversight function, the internal directors do not concurrently serve as heads of so-called business units (e.g., heads of research departments, etc.).

The AIST Group Executive Committee is chaired by the Chief Executive Officer and deliberates on matters related to management execution. The vice chairpersons are the Chief Technology Officer, the Chief Operating Officer, and the Chief Marketing and Business Officer. The Chief Technology Officer is responsible for the overall research of AIST, and is responsible for the overall optimization of research and development, thereby establishing a system to demonstrate the overall strength of the institute. In particular, AIST is advancing research toward “world-leading solutions to social issues,” which was set as the most important mission in the fifth medium- to long-term goal period, by taking advantage of its strength as a comprehensive research institute with diverse research areas. The Chief Operating Officer is in charge of organizational management, including general affairs and safety management, and is working to demonstrate our comprehensive capabilities, including organizational management functions.

Furthermore, under the direction of the Chief Executive Officer, the position of Chief Marketing and Business Officer responsible for promoting the social implementation and commercialization of AIST’s research results was initiated in April 2023 with the establishment of AISol, an organization to support the utilization of AIST’s research results. With this establishment, AIST constructed an organization and management structure for the entire AIST Group.

Organizational management structure

We will ensure the appropriateness of overall business operations so that AIST can fully demonstrate its capabilities and fulfill its mission.



Promotion of Compliance

To raise employee awareness of compliance and take our organizational culture to the next level, AIST undertakes the following measures to strengthen compliance:

Compliance initiatives

1. In principle, we hold a Compliance Promotion Committee meeting every week to gather risk information and determine how to address it. Risk information is also shared at regular in-house meetings to prevent recurrence.
2. In the event of an allegation of internal report or research misconduct, an investigation committee is formed to investigate the matter, the results are reported to the President, and necessary corrective measures are taken.
3. In line with the Compliance Specialist Committee of the Council of National Research and Development Agencies, we usually designate December as “Compliance Month.” We announce messages from management, hold training and seminars, and display posters in this month.
4. In addition to e-learning courses for the executives and employees, we provide compliance education as part of training for newly hired employees and management training for unit directors and research group leaders, with content adjusted to each group of participants.
5. In an effort to instill compliance, we post monthly compliance posters titled “Compliance Letter,” created under a different theme for each month. This is aimed at increasing employee awareness of compliance and urging them to be vigilant at work.

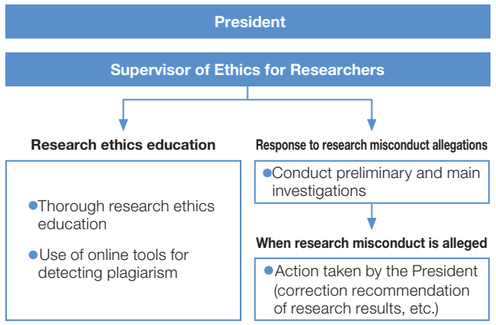
●Research misconduct

When an allegation on research misconduct is made, we handle the allegation rigorously in accordance with the relevant rules and regulations.

As part of our efforts to prevent the occurrence of research misconduct, we provide research ethics education through various training programs. We have also made and distributed the Handbook on Ethics for Researchers to the executives and employees that summarizes the ethical standards and precautions required as “5 minds” of researchers to fulfill their research activity.

We also promote the use of online tools for detecting plagiarism to prevent research misconduct.

●Response to research misconduct at AIST



●Management of Research records

As a public research institute, AIST has been strongly required to prevent research misconduct—such as fabrication, falsification, and plagiarism—, which is mentioned in the guidelines issued by the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of Economy, Trade and Industry.

Accordingly, AIST has set “Rules on Management of Research Records” and has made it obligatory to record research information. AIST has made it obligatory to register the research information required to be stored as research notebooks in the recording system to have the research notebooks examined by supervisors. In addition, to ensure the careful management of research information, AIST has restricted the removal of research notebooks and copies upon retirement, and has established guidelines for handling research information other than research notebooks.

AIST will continue to do its utmost to ensure the integrity and transparency in research and will make efforts to prevent research misconduct.

●Internal Report System

AIST has established an internal reporting system based on the regulations not only for consultation and reporting of harassment and research misconduct, but also for early detection and correction of misconduct to maintain public trust in AIST and to ensure fairness in business operations.

●Risk management

In FY 2023, AIST announced the arrest of an employee on suspicion of violation of the Unfair Competition Prevention Act and two cases of research misconduct. In the case of the violation of the Unfair Competition Prevention Act, the employee had taken AIST's technical information outside without permission, and in the case of the research misconduct, an investigation committee including outside experts conducted investigations and found specific misconduct (fabrication, falsification, etc.) in each case. We take these incidents very seriously, and to prevent such incidents from happening again, we will take group-wide measures, including further strengthening information management and thorough education on research ethics.

Disclosure of information and protection of personal information

●Disclosure of information

To increase the transparency of AIST’s activities and fulfil its accountability requirements, AIST proactively discloses information on its website and by other means in accordance with the Act on Access to Information Held by Incorporated Administrative Agencies (implemented October 1, 2002).

●Information Disclosure and Personal Information Protection Desk

Requests for information disclosure in accordance with the Act on Access to Information Held by Incorporated Administrative Agencies and the Act on the Protection of Personal Information can be made at Information Disclosure and Personal Information Protection desks of AIST Tsukuba and other regional research bases as well as the website (the website accepts request in accordance with the Act on Access to Information Held by Incorporated Administrative Agencies only). Each desk also provides help on the procedures for disclosure and personal information protection.

●Protection of personal information

In accordance with the Act on the Protection of Personal Information enforced on April 1, 2022, AIST protects the individual’s rights and interests while ensuring that activities at AIST are conducted properly and smoothly.

We promote understanding of personal information protection and appropriate management of personal information by educational training and e-learning to executives and employees every year. We also strive to raise awareness of the appropriate management of information including personal information and compliance of information security.

Internal Audits

At AIST, the Audit Office is deemed an independent organ that reports directly to the president. In collaboration with the auditor and the accounting auditor, the office endeavors to achieve (1) effective and efficient work, (2) observance of laws and ordinances governing AIST operations, (3) preservation of assets, and (4) reliable financial and other reports. Toward these ends, the office monitors whether individual operations function properly and efficiently and based on the findings, recommends improvements and other corrective actions. These internal audits are performed to support the auditees, not only by detecting and pointing out problems in work processes, but also by suggesting effective improvements based on mutual understanding that is built through thorough discussion on the problems.

●In FY 2023, audits were performed concerning the following topics:

・On specific themes that urgently need auditing as well as cross-sectional themes, for administrative headquarters, and research units, audits were conducted. While the audits confirmed that these operations were generally all being carried out properly, issues in terms of compliance, effectiveness, and efficiency of some were identified. The auditees concerned were advised to swiftly make suggested improvements and the improvements were confirmed.

・As information security audit and personal information management audit, audits were conducted on implementation status of various rules, and the audits confirmed that these matters were generally being handled properly.

●Collaboration in audits

	Internal audit ← Collaboration → Auditor audit ← Collaboration → Accounting auditor audit		
Scope of audit	●Operational audit ●Accounting audit ●Compliance audit	●Operational audit ●Accounting audit	●Accounting audit
Points of audit	●Activities as a whole ●Risk management, confirmation and appropriateness of operation of internal control systems ●Improvement of work process efficiency	●Activities as a whole ●Decision-making by the President ●Creation and operation of internal control systems ●Appropriateness of financial statements	●Appropriateness of financial statements (effectiveness of internal control systems)

Fair Operating Practice

We conduct appropriate work management based on the law.

Subject	Purpose	Action in FY 2023
Management of Conflict-of-Interest	Management of conflict-of-interest is conducted based on the rules for conflict-of-interest management.	•In order not to give the impression to society that individual profits from other parties in industry–academia–government collaborations are put before duty by executives or research responsibility, a conflict-of-interest management system is in place. 3,386 executives and employees who needed to declare their own status of conflict-of-interest all submitted their self-assessments. 3 employees who had particular concern for conflict-of-interest were interviewed by outside counselors to observe their activities. Additionally, after the Conflict-of-Interest Management Committee consisting of outside experts deliberated, they were notified of points of caution in promoting industry–academia–government collaborations. •In order not to give the impression that we are putting profits before public responsibility, from FY 2020, we operate a management system for conflict-of-interest on a full scale. We targeted 54 corporate bodies with which we have close collaborative relations, and will continue to observe the industry–academia–government collaboration activities and procurementresults in the Committee of Conflict-of-Interest.
Information Security	In order to ensure information security regarding information systems and important information, AIST implements measures that comply with Common Standards for Cybersecurity Measures for Government Agencies and Related Agencies.	●Information security measures •Planning and procurement for the implementation of a zero-trust security suitable for the institute's operations •Response to information security incidents by the Computer Security Incident Response Team (CSIRT) •Conduct drills based on business continuity plans in preparation for information security incidents, etc. ●Information security training •Training by job level according to roles related to information security ●Information security audit •Conducting information security audits for all departments
Implementation of Security Export Control	To maintain peace and security within the international community, AIST has tight security export controls in place in accordance with AIST's Rules on Security Export Control (internal rules and regulations), formulated based on the Foreign Exchange and Foreign Trade Act, thereby preventing AIST's technology from being used for the development of weapons of mass destruction.	Through (1) dissemination of the latest information on legislative amendments within AIST; (2) export control training for AIST staff; (3) export control instruction to individual staff members; (4) classification and transaction screening; and (5) internal audits, efforts are being made to raise awareness of security export control at staff level, and by maintenance of departmental systems, we are implementing appropriate export controls.
Promotion of Rational Procurement	We promote autonomous, continuous rational procurement with its operational attributes in mind while keeping its fairness, and transparency through the PDCA cycle, based on the Promotion of Rational Procurement in Incorporated Administrative Agencies (decided by the Minister for Internal Affairs and Communication May 25, 2015)	Each year, we formulate an AIST Rational Procurement Policy, and conduct ex-post facto inspections of individual contracts by a Contract Oversight Committee, whose members include outside experts. We answered to questions from members and obtained their agreement. Once a fiscal year ends, we conduct a self-assessment of how our rational procurement policy for the fiscal year has been implemented using the set indicators, and the results are publicized. As part of the CSR procurement and pursuant to the Act on Promotion of Government's Procurement of Goods Supplied by Facilities for Persons with Disabilities to Work, every year AIST also discloses its policy for promoting the procurement of goods from those facilities and its procurement results. As outcome of efforts in line with the policy, we were able to achieve a goal that exceeded the results of the previous year. Furthermore, AIST has introduced a procurement method that evaluates suppliers based on how they promote work-life balance, with the aim of realizing public procurement contributing to women's active participation in the workforce. (To see how the rational procurement plan is conducted, list of documents of the Contract Oversight Committee, AIST policy of Goods Supplied by Facilities for Persons with Disabilities to Work and procurement records, please look up announcements on the following website: aist.go.jp/aist_j/procure/)

Overview of AIST

Fifth Term Management Policy

Under the vision "Create the Future, Collaborate Together," AIST is pursuing research activities to give the world technologies that can enable a sustainable society, address social problems, and generate economic development.

Aiming to Fulfill the AIST Mission

AIST adopted the 5th Term Management Policy in September 2021. Backcasting from a future vision in which AIST continues to be at the core of the innovation ecosystem for the whole of Japan in the 7th Term and beyond, this management policy sets goals of the 7th Term being a period of evolution, the 6th Term being a period of growth, and the 5th Term being a period for building a prototype of the innovation ecosystem. To realize this future vision, we will maximize the value of AIST while accelerating social implementation.

Mapping the 5th Term Management Policy with a view to the long-term prospects of AIST

Maximizing the value of AIST

By switching from a cost accumulation basis to a value provided basis for cooperative research with private businesses and the like, we will produce a virtuous cycle in which capital investments in AIST increase, enabling strategic investment in subsequent research infrastructure and human resources.

Business scale in the 7th Term and beyond

To accelerate social implementation, we aim to double the scale of business of AIST Group, which includes external corporations, from the current business scale (about 100 billion yen) to 200 billion yen. We are aiming for private funds to then be of the order of 60 to 70 billion yen (bringing the ratio of private funds, public funds, and subsidies close to 1:1:1).

5th Term (FY 2020 to FY 2024)

Mapped as a period to "prototype a national innovation ecosystem with AIST at its core" with the tagline "establish the AIST brand," the aims are "coalitions of the strong with AIST at its core" and that "diverse coalitions lead regional innovation."

6th Term (FY 2025 to FY 2029)

Mapped as a period to "grow the national innovation ecosystem with AIST at its core" with the tagline "AIST leaps ahead," the aims are "coalitions of the strong turning social implementation models into reality" and that "diverse coalitions lead regional innovation to create new industries."

7th Term and beyond (from FY 2030)

Mapped as a period to "evolve the national innovation ecosystem with AIST at its core" with the tagline "continuing trust for AIST from society," the aims are for "the coalition of the strong model with AIST at its core to be a key for industrial growth in Japan" and that "new industries created by diverse coalitions drive regional economies."

Overview of the 5th Term Management Policy

In the 5th Term, we aim to increase the value of AIST by strengthening the core functions of a national innovation ecosystem and improving the team strength of AIST. In this way, we aim to build a prototype of the national innovation ecosystem and establish the AIST brand.

Realizing the building of this prototype starts with switching from the cost basis to value provided. Consequent to strategic investment in research infrastructure and human resources, the aim in the 5th Term is for the business scale of the whole AIST Group including external corporations to reach around 120 billion yen, about 20 billion yen of that being private capital.

(1) Strengthening the core functions of the national innovation ecosystem

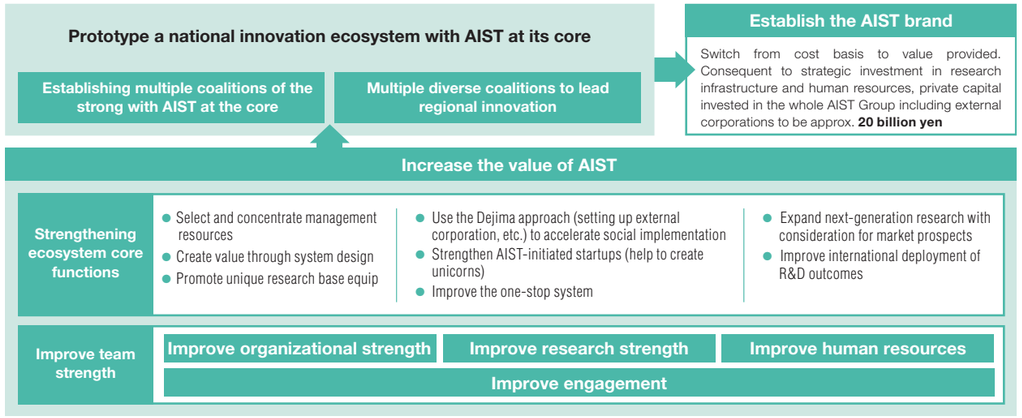
- We will further enhance AIST's strengths by selecting and concentrating management resources, creating value through system design, and promoting unique research base equipment.
- We will improve social implementation of research outcomes by using the Dejima approach (setting up external corporations and the like) to accelerate social implementation, strengthening AIST-initiated startups (helping to create unicorns), and improving the one-stop system.
- We will enhance AIST's potential by expanding next-generation research with consideration for market prospects and improving international deployment of R&D outcomes.

(2) Improving the team strength of AIST

- Manifesting AIST's team strength to the greatest extent is important for increasing the value of AIST. We will improve each of the elements that make up AIST's team strength: 1) research strength, 2) organizational strength and 3) human resources.
- Improving engagement based on two-way trust and assistance between staff and the organization is also important as a foundation for the three elements of AIST's team strength. As key points in improving engagement, we will work on (1) building relationships of trust, (2) sharing a vision, (3) providing fulfillment, (4) preparing suitable workplaces, and (5) supporting personal development.

Overview of the 5th Term Management Policy

5th Term targets: Solving social problems and strengthening industrial competitiveness



TOPICS

Toward the penetration of management policies

As the AIST Group works together to realize its management policies, the President's Message program is delivered once a quarter as an opportunity for the top management to convey a direct message to all people working in the AIST Group.

In FY 2023, the program was held four times, and in order to provide an opportunity for all people working in the AIST Group to work together with a sense of unity, employees from diverse locations and job categories also appeared on the program to talk directly with top management, thereby contributing not only to the dissemination and penetration of management policies but also to the revitalization of internal communication.

Financial Data

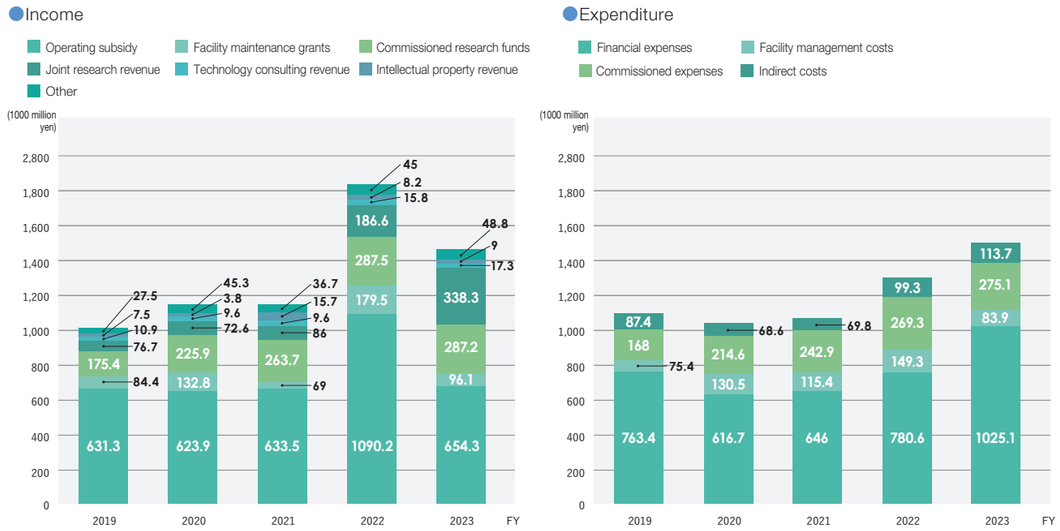
Consolidated Statements of Income (April 1, 2023–March 31, 2024)

(Yen)

Subject			Amount	
Operating costs	Research service expenses	Personnel expenses	43,751,644,549	
		Depreciation and amortization	15,232,851,908	
		Other research service expenses	43,207,580,928	102,192,077,385
	General management expenses	Personnel expenses	3,266,793,323	
		Depreciation and amortization	132,588,396	
		Other general and administrative expenses	5,847,668,668	9,247,050,387
	Total operating expenses			**111,439,127,772**
Revenue	Subsidy revenue*	Revenue from subsidy for operation	52,805,547,329	
		Reversal of subsidy for operation in lieu of assets	5,809,706,255	58,615,253,584
	Revenues from receipt of goods and services			1,157,353,753
	Intellectual property revenue			1,070,290,370
	Research revenue			34,937,243,141
	Commissioned research funds	National and local governments	3,977,747,834	
		Other Organizations	21,089,354,180	25,067,102,014
	Subsidy and other revenue*			681,312,005
	Donation revenue*			37,986,640
	Revenue related to the bonus allowance receivable*			4,539,031,789
	Income related to the provision for retirement benefits*			1,915,451,228
	Miscellaneous income	Building and property loan fees	22,187,470	
		Other	756,293,008	778,480,478
	Total revenue			**128,799,505,002**
	Operating profit			**17,360,377,230**
Non-recurring loss	Loss on disposal of fixed assets		332,030,220	
	Impairment loss of fixed assets		3,570,557	
	Other		197,206	
	Total non-recurring loss			**335,797,983**
Non-recurring profit	Reversal of operating subsidy in lieu of assets*		59,748,537	
	Reversal of donated assets*		15,918,053	
	Reversal of donation received in lieu of assets*		147	
	Reversal of grants-in-lieu-of-assets, etc.*		626,793	
	Reversal of provision for loss on damages*		300,000,000	
	Other		16,225,547	
	Total non-recurring income			**392,519,077**
Income before income taxes and minority interests				**17,417,098,324**
Corporate, resident and business taxes				31,767,701
Net income				**17,385,330,623**
Reversal of reserve carried forward from the previous medium-term target period*				**927,537,905**
Gross profit for the year				**18,312,868,528**

*These are account items associated with accounting procedures specific to independent administrative agencies.

Financial Data



*Numbers may not equal totals due to rounding to the nearest 10 million yen.
*The figures for fiscal years 2019 through 2022 are the amount of the settlement of accounts in the “Statement of Accounts” stipulated in Article 38 of the Act on General Rules for Incorporated Administrative Agencies.
*The figures for FY 2023 represent the total revenues and total expenses of the AIST Group and are calculated for convenience in order to show the scale of the AIST Group’s business.

THIRD PARTY OPINION

In the editorial policy, it was clearly stated that the report "aims to be an integrated report that comprehensively conveys the entire picture of AIST's activities, going beyond the scope of a conventional sustainability report." This report describes AIST's vision for 2030 and beyond as "the core of the national innovation ecosystem," and reports on the various organizational and management reforms currently being undertaken, backcasting from this vision. An integrated report is the most appropriate medium at this stage to convey this sense of dynamism and the value creation process toward the vision, and we believe choosing such a form was a wise decision. The framework of the entire report is summarized on pages 06–07, "AIST Group Initiatives for Value Creation," which was prepared with full consideration of AIST's position, and it is a very convincing value creation process. Regarding outcomes, IIRC clarifies that there is a lack of understanding of the concept of outcomes and limited disclosure of outcomes compared to outputs, but we understand that the description here is accurate and will have a significant impact on the two missions.

Recently, human capital has been the focus of attention and disclosure of related matters has been progressing. AIST, which has human resources as its core competence, has also detailed the improvement of human resource capabilities and engagement as "human capital management" in this report. One of the most memorable aspects of the report is the initiative to acquire doctoral degrees. PhD holders have a weak presence in Japan, and if the trend away from doctoral degrees continues, it is inevitable that our national strength will be damaged. We hope that you will continue to report on the results of this matter in the future.

There are some requests for reports for the next year and beyond. The most important of them is the identification of materiality. Some reports indicate that approximately 90% of integrated reports identify it. This is because materiality identification plays an important role in improving the quality of communication by identifying the key challenges and opportunities facing the organization and clarifying the value creation strategy to realize the vision. When identifying materiality, we expect discussions to take place across various departments, not just a few. This will break down silos between departments, stimulate discussion within the organization, and cultivate "integrated thinking," which we believe will make a significant contribution not only to the preparation of integrated reports but also to management reform.

Workers Club for Eco-harmonic Renewable Society (NPO)

YAMAGUCHI Tamio, Director

AUDITOR'S OPINION

The most impressive achievement during the 5th mid- to long-term target period, especially in FY 2023, is that AIST has put high priority on building up its value creation process to help our society and companies solve serious problems. It has spun off its marketing functions to its fully-owned company (AISol) which contributes most effectively to the solutions of the above problems, and has started its new governance system as the AIST Group. I appreciate that the AIST Group is strongly conscious of promoting integrated research through collaboration and cooperation among each research area in a wide range of fields from basic research to social implementation toward the management goal. The brand-new policy has been well discussed and summarized in one easy-to-understand diagram (p. 06–07) as the Group's value creation process. The AIST Group as well as Japanese corporations as a whole have their traditional tendency to convince themselves that good things would be valued fairly by the public without speaking out about their excellence and usefulness. However, now there is an assertive attitude toward advancing valuable R&D, achieving remarkable outcomes, and being given their legitimate evaluation on the assumption that it is based on deep discussion and full understanding of what is necessary to solve social and corporate problems. The people of the AIST Group are currently in the process of changing the mindset to overcome the traditional framework of a National Research and Development Agency. Needless to say, this unprecedented battle for change has a long way to go.

In doing so, I emphasize that establishing an unwavering governance structure as the AIST Group, including AISol, on a trial-and-error basis, is the first requirement for achieving the Group's objectives. In particular, the brilliant management of the Group's organization and human capital is important so that its people with diversified backgrounds corporate with each other to achieve maximum outputs. The AIST Group has conducted wide-ranging internal and external reforms to this end. The Group is suffering from its complicated operation processes because AIST as an independent administrative agency and AISol as a company have to follow different procedures due to different laws and accounting standards. It will aim to overcome the difficulties to achieve its integrated management as the AIST Group. I look forward to the establishment of the AIST Group's organization that considers the balance between the promotion of free and vigorous research operations and the solid compliance systems.

Lastly, I must inform you about two regrettable incidents that have deeply damaged the Group's unrelenting efforts for change. The arrest of an ex-researcher for his leakage of technical information and the revelations of research misconduct by another researcher last year have harmed the Group's high reputation considerably. The Group has taken many effective measures to prevent recurrence of such incidents, but ultimately it is a matter of the morals of all those belonging to the AIST Group. I strongly hope that all the people of the AIST Group are fully aware that these incidents are their problem, not others', and build up a vibrant organization with a high level of moral and compliance.

KIKUCHI Masahiro, Auditor

On the Publication of AIST Report 2024

AIST has decided to publish AIST Report 2024, which aims to enhance the contents of the Sustainability Report up to the last fiscal year and to go beyond the existing reports to become an integrated report for the AIST Group.

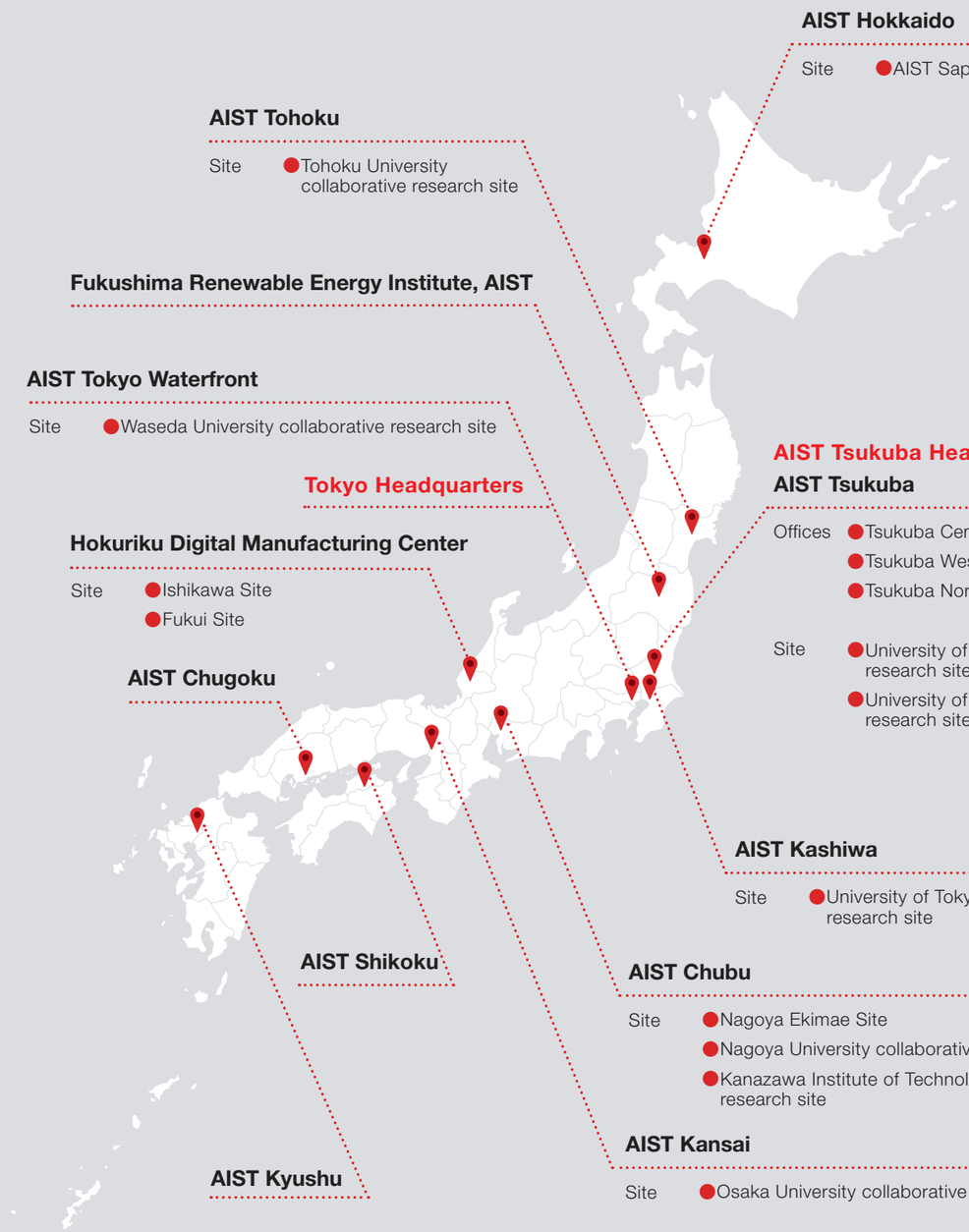
As we enter the final year of the fifth medium- to long-term target period, in the opening message from President and Chief Executive Officer ISHIMURA Kazuhiko, he described the organizational transformation that has been underway up to the last fiscal year. In order to become the core of the national innovation ecosystem, the AIST Group is promoting collaboration with companies and public institutions, strengthening marketing functions, enhancing governance, and improving engagement. "Promoting R&D and Social Implementation to Achieve the Mission" featured a dialogue between the AIST Group's Chief Technology Officer and Chief Marketing and Business Officer who expressed their commitment to the future of the AIST Group, and introduced four examples of research promotion. The AIST Group's value creation process was repeatedly discussed at the AIST Group Management Meeting to enhance the content. YANAGI Hiroyuki, Vice-President (part-time) and Advisor to Yamaha Motor Co., Ltd. expressed his high expectations for AIST's challenge to a new Japanese open innovation model. At the end of the report, as a third-party opinion, we received valuable comments and guidance from Mr. YAMAGUCHI Tamio, Director of the Workers Club for Eco-harmonic Renewable Society, a non-profit organization. We also included an opinion from an internal perspective of the organization by KIKUCHI Masahiro, Auditor.

Working together with stakeholders to "Create the Future, Collaborate Together," the AIST Group will work as one to drive innovation in Japan. Through this report, we will strive to build a deeper relationship of trust with society by introducing the activities of the AIST Group and our vision for the future.

MIYAZAKI Koyomi, Director, Branding and Public Relations Department

Research Bases

as of Aug. 2024



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Published in March, 2025

仕事と介護の両立支援

女性が活躍しています

VEGETABLE OIL INK